
CANCER INCIDENCE AND MORTALITY
IN MASSACHUSETTS
2000-2004:
STATEWIDE REPORT

Center for Health Information, Statistics,
Research, and Evaluation

Massachusetts Department of Public Health

July 2007

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Massachusetts Department of Public Health

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TABLE OF CONTENTS

	<u>Page</u>
Executive Summary	1
Introduction.....	5
Content	7
New in This Report	7
Methods	9
Data Sources.....	11
Definitions.....	12
Interpreting the Data.....	14
Table A. North American Association of Central Cancer Registries (NAACCR) Certification Results for the Massachusetts Cancer Registry (MCR).....	16
Overview.....	17
Leading Types of Cancer	19
Cancer Incidence Patterns by Age	20
Cancer Trends.....	20
Cancer Patterns by Race/Ethnicity	22
Massachusetts Compared to the U.S.	24
Figures & Tables.....	25
Figure 1. Cancer incidence cases by cancer type and sex, Massachusetts, 2000-2004	27
Figure 2. Incidence rates for ten leading cancer types by sex, Massachusetts, 2000- 2004.....	28
Figure 3. Cancer mortality cases by cancer type and sex, Massachusetts, 2000-2004.....	29
Figure 4. Mortality rates for ten leading cancer types by sex, Massachusetts, 2000- 2004	30
Table 1. Age-specific incidence rates and median ages for selected cancer sites, Massachusetts, 2000-2004, males.....	31
Table 2. Age-specific incidence rates and median ages for selected cancer sites, Massachusetts, 2000-2004, females.....	32
Table 3. Age-specific incidence rates and median ages for selected cancer sites, Massachusetts, 2000-2004, total	33

Figure 5. Estimated annual percent change (EAPC) in age-adjusted cancer rates among males, Massachusetts, 2000-2004	34
Figure 6. Estimated annual percent change (EAPC) in age-adjusted cancer rates among females, Massachusetts, 2000-2004.....	35
Table 4. Annual age-adjusted incidence rates for selected cancer sites, Massachusetts, 2000-2004, males.....	36
Table 5. Annual age-adjusted incidence rates for selected cancer sites, Massachusetts, 2000-2004, females.....	37
Table 6. Annual age-adjusted incidence rates for selected cancer sites, Massachusetts, 2000-2004, total	38
Table 7. Annual age-adjusted mortality rates for selected cancer sites, Massachusetts, 2000-2004, males.....	39
Table 8. Annual age-adjusted mortality rates for selected cancer sites, Massachusetts, 2000-2004, females.....	40
Table 9. Annual age-adjusted mortality rates for selected cancer sites, Massachusetts, 2000-2004, total	41
Table 10. Five leading cancer incidence rates by race/ethnicity and sex, Massachusetts, 2000-2004	42
Table 11. Incidence cases and percentage of cases for selected cancer sites by race/ethnicity, Massachusetts, 2000-2004, males	43
Table 12. Incidence cases and percentage of cases for selected cancer sites by race/ethnicity, Massachusetts, 2000-2004, females	44
Table 13. Incidence cases and percentage of cases for selected cancer sites by race/ethnicity, Massachusetts, 2000-2004, total	45
Table 14. Age-adjusted incidence rates and 95% confidence limits (95% CL) for selected cancer sites by race/ethnicity, Massachusetts, 2000-2004, males.....	46
Table 15. Age-adjusted incidence rates and 95% confidence limits (95% CL) for selected cancer sites by race/ethnicity, Massachusetts, 2000-2004, females.....	47
Table 16. Age-adjusted incidence rates and 95% confidence limits (95% CL) for selected cancer sites by race/ethnicity, Massachusetts, 2000-2004, total	48
Table 17. Five leading cancer mortality rates by race/ethnicity and sex, Massachusetts, 2000-2004.....	49
Table 18. Mortality cases and percentage of cases for selected cancer sites by race/ethnicity, Massachusetts, 2000-2004, males	50
Table 19. Mortality cases and percentage of cases for selected cancer sites by race/ethnicity, Massachusetts, 2000-2004, females	51
Table 20. Mortality cases and percentage of cases for selected cancer sites by race/ethnicity, Massachusetts, 2000-2004, total	52

Table 21. Age-adjusted mortality rates and 95% confidence limits (95% CL) for selected cancer sites by race/ethnicity, Massachusetts, 2000-2004, males	53
Table 22. Age-adjusted mortality rates and 95% confidence limits (95% CL) for selected cancer sites by race/ethnicity, Massachusetts, 2000-2004, females.....	54
Table 23. Age-adjusted mortality rates and 95% confidence limits (95% CL) for selected cancer sites by race/ethnicity, Massachusetts, 2000-2004, total	55
Table 24. Incidence and mortality rates for selected cancer sites by sex, Massachusetts residents, 2000-2004, and NAACCR registries, 1999-2003.....	56
Special Section: Urinary Bladder Cancer	57
Introduction	59
Long Term Incidence and Mortality Trends	60
Figure 7. Age-adjusted urinary bladder cancer incidence and mortality rates for males and females, Massachusetts, 1995-2004.....	60
Age-Specific Incidence Rates by Sex.....	61
Figure 8. Age-specific urinary bladder cancer incidence rates for males and females, Massachusetts, 2000-2004	61
Incidence Rates by Race/Ethnicity and Sex	63
Figure 9. Average annual age-adjusted urinary bladder cancer incidence rates for males and females, Massachusetts, 2000-2004.....	63
Urinary Bladder Cancer by Histology Groups and Sex	64
Urinary Bladder Cancer by Stage and Sex	65
Figure 10. Distribution of <i>in situ</i> and invasive urinary bladder cancer incident cases by stage and sex, Massachusetts, 2000-2004.....	65
Urinary Bladder Cancer by Region vs. State	65
Figure 11. Male urinary bladder cancer incidence rates by stage at diagnosis, Massachusetts by EOHHS region, 2000-2004.....	67
Figure 12. Female urinary bladder cancer incidence rates by stage at diagnosis, Massachusetts by EOHHS region, 2000-2004.....	68
Probability of Developing or Dying from Urinary Bladder Cancer	69
Table 25. Probability of developing urinary bladder cancer by a specific age for males and females, Massachusetts, 2000-2004.....	70
Table 26. Probability of dying of urinary bladder cancer by a specific age for males and females, Massachusetts, 2000-2004	71
Summary	71
Appendix U-I. Age-adjusted incidence rates, numbers of cases, 95% confidence intervals (95%CI), and significance for urinary bladder cancer by region and stage, Massachusetts, 2000-2004, males.....	73

Appendix U-II. Age-adjusted incidence rates, number of cases, 95% confidence intervals (95% CI), and significance for urinary bladder cancer by region and stage, Massachusetts, 2000-2004, females.....	74
Appendix U-III. Histology grouping for the urinary bladder special section report	75
Appendices.....	77
Appendix I. ICD codes used for this report	79
Appendix II. Population and rate changes.....	81
Appendix III. Population estimates by age, race/ethnicity, and sex, Massachusetts, 1999-2003	82
References	83

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Cancer Incidence and Mortality in Massachusetts, 2000-2004: Statewide Report presents cancer incidence and mortality data for the Commonwealth from 2000 through 2004. The data include numbers and rates for twenty-four types of cancer, detailed information about the most commonly occurring types of cancer, information about age-specific patterns, a discussion of cancer trends, an examination of patterns by race/ethnicity, and a comparison of Massachusetts and national cancer rates. The report provides data only on invasive cancer, except for urinary bladder (which includes *in situ* and invasive cancers combined) and *in situ* breast cancer. This year, the special section focuses on bladder cancer and includes twenty-three-year incidence and mortality trends and age-conditional probabilities of developing and dying from bladder cancer.

Highlights from the report

- From 2000 to 2004 there were 174,719 newly diagnosed cases of cancer and 68,485 deaths from cancer among Massachusetts residents. The average annual age-adjusted incidence rate was 515.4 per 100,000 persons, and the average annual age-adjusted mortality rate was 197.0 per 100,000 persons. Overall, cancer incidence rates for males in Massachusetts over the years 2000-2004 decreased an average of 1.6% per year, though this decrease was not statistically significant. Among Massachusetts females, overall incidence rates remained stable over this time period. Mortality from all types of cancer combined decreased by 2.9% annually for males, and by 1.7% for females from 2000-2004, both statistically significant decreases.
- Prostate cancer was the most common type of newly diagnosed cancer among Massachusetts males. Prostate cancer accounted for 29% of new cancers among males in the state from 2000 to 2004. The average annual age-adjusted incidence rate of prostate cancer was 176.1 per 100,000 males. The annual incidence rate of prostate cancer decreased an average of 5.5% per year, a statistically significant trend from 2000 to 2004. The mortality rate of prostate cancer decreased significantly by 6.4% per year from 2000 to 2004.
- From 2000 to 2004, invasive breast cancer was the most common type of newly diagnosed cancer among Massachusetts females, accounting for approximately 29% of new cancers among females in the state. The average annual age-adjusted incidence rate of breast cancer was 136.7 per 100,000 females. The incidence rate of female invasive breast cancer decreased significantly over the years 2000-2004 by 2.1% annually. The mortality rate from breast cancer also decreased during this period by 3.0% annually, which was statistically significant. The age-adjusted incidence rate of *in situ* breast cancer for Massachusetts females was 47.5 per 100,000.
- Cancer of the bronchus and lung was the most common cause of cancer deaths among both Massachusetts males and females between 2000 and 2004, accounting for 29% of all deaths among males and about 25% of all deaths among females. During this time period, the mortality rate of cancer of the bronchus and lung in Massachusetts decreased by 2.6% annually for males and decreased by 0.2% annually for females. These changes were statistically significant for males, but were not significant for females. The slight decrease for females, however, is encouraging given that for the period of 1999-2003, female mortality rates due to lung cancer had increased significantly by 2.7%.
- The incidence rate of cancer of the bronchus and lung increased by 0.6% per year for Massachusetts females during 2000-2004 and decreased by 1.7% for

males. Neither of these changes was statistically significant.

- For all types of cancer combined for 2000-2004, black, non-Hispanics had the highest age-adjusted incidence and mortality rates among Massachusetts males. Both the incidence and the mortality rates were significantly higher than all other racial/ethnic groups.
- For all Massachusetts male race/ethnicity groups diagnosed between 2000 and 2004, cancers of the prostate, bronchus and lung, and colon/rectum were the top three most commonly diagnosed cancers, and cancer of the bronchus and lung was the most common cause of cancer death.
- For all types of cancer combined for 2000-2004, white, non-Hispanics had the highest age-adjusted incidence rate among Massachusetts females and black, non-Hispanic females had the highest age-adjusted mortality rate. While the mortality rates for black, non-Hispanic females were significantly higher than those of Asian, non-Hispanic females and Hispanic females, they were not statistically significantly different from those of white, non-Hispanic females.
- Breast cancer was the most commonly diagnosed cancer for all Massachusetts female race/ethnicity groups from 2000 to 2004. Cancers of the bronchus and lung and colon/rectum were among the next two leading cancers among females. Bronchus and lung was second and colon/rectum was third for white, non-Hispanic and black, non-Hispanic females. For Asian, non-Hispanic and Hispanic females, colon/rectum was second and bronchus and lung was third.
- Between 2000 and 2004, cancer of the bronchus and lung was the most common cause of cancer death among all female race/ethnicities in Massachusetts, except Hispanic females. Breast cancer was the

most common cause of death among Hispanic females.

- Age-adjusted cancer incidence rates in Massachusetts were generally higher than their national counterparts. The Massachusetts male and female incidence rates for all sites combined for the period 2000 through 2004 were 604.8 per 100,000 and 455.5 per 100,000, respectively, while the 2000-2004 rates for the North American Association of Central Cancer Registries (NAACCR) were 557.8 per 100,000 and 413.1 per 100,000, respectively.
- Similarly, age-adjusted cancer mortality rates in Massachusetts females for 2000-2004 were slightly higher than age-adjusted mortality rates in the United States, and male mortality rates were slightly lower. For all cancer sites combined, national versus Massachusetts mortality rates were 243.7 per 100,000 versus 241.6 per 100,000 for males and 164.3 per 100,000 versus 169.2 per 100,000 for females.
- Urinary bladder cancer incidence and mortality rates have remained rather stable over the last decade with males having higher rates than females. Over the last five years, the probability of developing urinary bladder cancer over a lifespan (0-85 years) was 3.5% for males and 1.2% for females, but the probability of dying from urinary bladder cancer was only 0.7% for males and 0.3% for females.

INTRODUCTION

INTRODUCTION

The Massachusetts Cancer Registry (MCR) collects reports of newly diagnosed cases of cancer and routinely compiles summaries of cancer incidence and mortality data. This report, *Cancer Incidence and Mortality in Massachusetts, 2000-2004: Statewide Report*, is produced annually with statewide data. Another report, *Cancer Incidence in Massachusetts: City and Town Supplement*, is also produced annually and contains information for the 351 cities and towns in Massachusetts. Electronic versions of these reports may be found on the Internet at <http://www.mass.gov/dph/mcr>.

Content

This report:

- provides statewide information on cancer incidence and mortality in Massachusetts for twenty-four types of cancer and for all cancers combined for 2000 through 2004;*
- provides detailed information about the most commonly occurring types of cancer for 2000 through 2004;
- examines cancer incidence patterns by age, sex, and race/ethnicity;
- reviews Massachusetts cancer incidence and mortality trends for 2000 through 2004;
- compares Massachusetts incidence and mortality data with national incidence and mortality data; and
- provides detailed information about bladder cancer in Massachusetts.

The rest of the report is organized into the following sections:

- **METHODS** provides a detailed explanation of the data collection, data processing, and statistical techniques employed in this report and the limitations to consider when reviewing the data.

- **OVERVIEW** provides an overview of cancer incidence and mortality data in Massachusetts from 2000 through 2004, including leading types of cancer, cancer incidence by age and sex, cancer trends, cancer patterns by race/ethnicity, and a comparison of rates in Massachusetts as compared to the U.S.
- **FIGURES & TABLES** presents cancer incidence and mortality data for twenty-four types of cancer for 2000-2004. There are six figures and twenty-four tables in this section with breakdowns such as sex, race/ethnicity, year, age group, state data versus national data, and cancer type.
- **SPECIAL SECTION: URINARY BLADDER CANCER** provides detailed information about the incidence of and mortality from urinary bladder cancer.
- **APPENDICES** provide information supplemental to this report, including a listing of codes used to prepare the report, information on population and rate changes, and population estimates.

** The Massachusetts incidence data in this report include only invasive cancers for twenty-two of the twenty-four types of cancer. Cancer of the urinary bladder includes both in situ and invasive cases. Cancer of the breast in situ is presented as a separate category, but is not included in the "all sites combined" data.*

New in This Report

- There is a major change in the population data in this report. Starting with this report, new population estimates are being used for the period 2000-2004. The population estimates are from the Census Bureau's Population Estimation Program. **RATES IN THIS REPORT CANNOT BE COMPARED WITH THOSE PUBLISHED IN PREVIOUS REPORTS.** This is because the overall population count and the age

distribution of the population, which were based on the Census 2000 count, differ. The difference in the new population estimates is pronounced for Hispanics and black non-Hispanics. Refer to Appendix II of this report for more detail.

Special Section:

This year, the highlighted special section focuses on urinary bladder cancer. This section includes information on the epidemiology of bladder cancer, incidence and mortality trends, and probabilities of developing or dying from bladder cancer. It also incorporates data analysis with mapping for the state.

METHODS

METHODS

Data Sources

Cancer Incidence

The MCR collects reports of newly diagnosed cancer cases. Facilities reporting to the MCR in 2004 included 69 Massachusetts acute care hospitals, one medical practice association, six laboratories, one radiation/oncology facility, endoscopy centers, dermatologists, and urologists. Reports from dermatologists' offices and dermatopathology laboratories, particularly on cases of melanoma, have only been collected by the MCR since 2001. Reports from urologists' offices have only been collected by the MCR since 2002. Currently, the MCR collects information on *in situ* and invasive cancers and benign tumors of the brain and associated tissues. The MCR does not collect information on basal and squamous cell carcinomas of the skin.

The MCR also collects information from reporting hospitals on cases diagnosed and treated in staff physician offices when this information is available. Not all hospitals report this type of case, however, and some hospitals report such cases as if the patients had been diagnosed and treated by the hospital directly. Collecting this type of data makes the MCR's overall case ascertainment more complete. Some cancer types that may be reported to the MCR in this manner are melanoma, prostate, colon, and oral cancer.

In addition, the MCR identifies previously unreported cancer cases through review of death certificate data to further improve case completeness. This process is referred to as death clearance and identifies cancers mentioned on death certificates that were not previously reported to the MCR. In some instances, the MCR obtains additional information on these cases through follow-up activities with hospitals, nursing homes, and physicians' offices. In other instances, a cancer-related cause of death recorded on a Massachusetts death certificate is the only source of information for a cancer case. These "death certificate only" cancer diagnoses are, therefore, poorly documented, and have not been confirmed by review of complete clinical

information. Such cases are included in this report, but they comprise less than 3% of all cancer cases.

Case reports from 2000 were coded following the International Classification of Diseases for Oncology, Second Edition (ICD-O-2) system (1). The International Classification of Diseases for Oncology, Third Edition (ICD-O-3) was implemented in North America with cases diagnosed as of January 1, 2001 (2). For comparability of the data, all cancer cases diagnosed prior to January 1, 2001, coded in ICD-O-2, were converted to ICD-O-3 following the SEER rules of conversion (3).

Each year, the North American Association of Central Cancer Registries (NAACCR) reviews cancer registry data for quality, completeness, and timeliness. The NAACCR certification results for the MCR for diagnosis years 2000-2004 are presented in Table A. For 2000-2004, the MCR's annual case count was estimated by NAACCR to be more than 95% complete each year. The MCR achieved the gold standard for this certification element as well as for six other certification elements for each year from 2000-2004.

The Massachusetts cancer cases presented in this report are primary cases of cancer diagnosed among Massachusetts residents during 2000-2004 and reported to the MCR as of December 26, 2006. These data include some additional cases diagnosed in 2000-2003 that were not counted in the previous report because they were reported to the MCR too late to be incorporated in that report. Cancer site/types were grouped according to coding definitions adapted from the National Cancer Institute (NCI)'s Surveillance, Epidemiology, and End Results (SEER) Program (Appendix I). The Massachusetts data presented are invasive cancers, with the exception of urinary bladder and breast cancer. Both *in situ* and invasive cancers are presented for these sites. *In situ* cancers are neoplasms diagnosed at the earliest stage, before they have spread, when they are limited to a small number of cells and have not invaded the organ itself. Invasive cancers have spread beyond the layer of cells where they started and have the potential to spread to other parts of the body. Typically, published incidence rates do

not combine invasive and *in situ* cancers due to differences in the biologic significance, survival prognosis, and types of treatment of the tumors. Because a substantial number of breast cancers are diagnosed at a pre-invasive (*in situ*) stage, we present an additional category for these data that is separate from the invasive breast cancer data. The *in situ* breast cancer cases are not added into the totals for all cancer sites combined. Due to the specific nature of the diagnostic techniques and treatment patterns, *in situ* and invasive cancers of the urinary bladder are combined and *in situ* urinary bladder is added into the totals for all cancer sites combined.

The national incidence data are from NAACCR. The NAACCR incidence rates include data from 36 states, 5 metropolitan areas, and the District of Columbia and cover about 77% of the United States population including Massachusetts (4).

Cancer Mortality

The Massachusetts death data were obtained from the Massachusetts Registry of Vital Records and Statistics, which has legal responsibility for collecting reports of deaths in this state. Death reports from 2000 to 2004 were coded using the International Classification of Diseases, Tenth Revision (ICD-10) (5). The cancer site/type groups for deaths in this report were based on cancer site/type categories from the National Cancer Institute's Surveillance, Epidemiology, and End Results Program (SEER) Program (Appendix I). These SEER cancer site/type definitions are the standard categories commonly used by cancer registries. The cancer mortality data published in this report may differ slightly from the cancer mortality data published in *Massachusetts Deaths*, the annual Massachusetts Department of Public Health mortality surveillance publication, because *Massachusetts Deaths* uses cancer site/type groupings from the National Center for Health Statistics.

The U.S. mortality data presented here are from NAACCR which uses data from the National Center for Health Statistics (6). The NAACCR mortality rates cover the entire U.S. population from 2000-2004.

Definitions

Maps

Maps in this report were generated using a computerized geographic information system (GIS). Arcmap version 9.1, distributed by Environmental Systems Research Institute (ESRI), was the GIS software Massachusetts Cancer Registry (MCR) staff utilized to display these cartographic data. The cartographic data depicted are collected, maintained, and distributed by the Executive Office of Environmental Affairs (EOEA), MassGIS. Maps generated by the MCR meet graphic standards set forth by the Massachusetts Department of Public Health for map data depiction.

Population Estimates

All of the population estimates used in this report were produced by the National Center for Health Statistics (NCHS) in collaboration with the Census Bureau's Population Estimation Program. The NCHS reallocates the multiple race categories from the Census Bureau population estimates file to create four mutually exclusive race categories that are consistent with the race categories used to collect cancer incidence and cancer mortality data. The population data used in this report are presented in Appendix II.

Race/Ethnicity

The MCR uses an algorithm developed by NAACCR called the NAACCR Hispanic Identification Algorithm (NHIA) to help classify Hispanic ethnicity. The algorithm is only applied to cases with an unknown Spanish/Hispanic origin or cases that have been classified as Hispanic based on a Spanish surname only. The algorithm uses last name, maiden name, birthplace, race, and sex to determine the ethnicity of these cases.

The race/ethnicity categories presented in this report are mutually exclusive. Cases and deaths are only included in one race/ethnicity category. The race/ethnicity tables include the categories white, non-Hispanic; black, non-Hispanic; Asian, non-Hispanic; and Hispanic. The total population in Massachusetts also includes unknown races/

ethnicities and American Indians. As a result, the number of cases for the total population is not the sum of cases by race/ethnicity.

Statistical Terms

- *Age-Specific Rates* – Age-specific rates were calculated by dividing the number of people in an age group who were diagnosed with cancer or died of cancer in a given time frame by the number of people in that same age group overall in that time frame. They are presented as rates per 100,000 residents and are site- and sex-specific.
- *Age-Adjusted Rates* – An age-adjusted incidence or mortality rate is a weighted average of the age-specific rates, where the weights are the proportions of persons in the corresponding age groups of a standard 100,000 population. The potential confounding effect of age is reduced when comparing age-adjusted rates for different age-structured populations. The 2000 U.S. Bureau of the Census population distribution was used as a standard. Rates were age-adjusted using 18 five-year age groups. Age-adjusted rates can only be compared if they are adjusted to the same standard population. It is also important to note that differences in methodologies used in calculating rates, such as number of age groups used, may cause slight variations in results.

Confidence Intervals (CI) or Confidence Limits (CL) - The confidence interval (CI)—also called a confidence limit (CL)—is a range of values determined by the degree of variability of the data within which the true value should lie. The 95% confidence intervals presented in this report mean that 95 times out of 100 this range of values will contain the true one. The confidence interval indicates the precision of the rate calculation; the wider the interval, the less certain the rate. Statistically, the width of the interval reflects the size of the population and the number of events; smaller populations and smaller number of cases yield less precise estimates that have wider confidence intervals. Confidence intervals were used in the report as a conservative statistical test

to estimate the difference between the age-adjusted incidence or mortality rates with the probability of error of 5% or less ($p \leq 0.05$). Rates and confidence intervals were not calculated when there were fewer than twenty cases.

- *Estimated Annual Percent Change (EAPC)* – The EAPC is a statistical method for trend analysis. It shows how much a cancer rate has increased or decreased over the observed period of time. This estimation assumes that the change in incidence or mortality rates is constant during the observed time period. The EAPC for a short time period (2000-2004 for this report) was calculated using the SEER methods. The $EAPC = 100 * (e^m - 1)$, where m is a slope of the linear regression line which is an approximation of the function of the natural logarithm of the rates by the year of diagnosis (7). A positive EAPC corresponds to an increasing trend, while a negative EAPC corresponds to a decreasing trend. All of the EAPC values calculated in this report were statistically tested ($p \leq 0.05$) against the hypothesis that they are equal to zero (the rate is neither increasing nor decreasing).
- *Joinpoint Regression Analysis of Cancer Trends* – As the EAPC is a linear approximation, it may not give an accurate picture of long-term trends. SEER provides software to calculate the number and location (in time) of points where trends change direction (joinpoints). At each joinpoint, the trend may change in different ways. The joinpoint regression model describes the trend as a sequence of linear segments between corresponding joinpoints, so that each segment has an associated EAPC positive trend, negative trend or no trend (8).
- *Median Age at Diagnosis* – The median age at diagnosis is the point (in age) where half of cancer cases occurred below this age and half of cases occurred above this age.
- *Probability of Being Diagnosed With or Dying From Cancer* – These probabilities were calculated using the DevCan Software developed by SEER (9). The results are

presented as tables showing the probability (in percentage) of a person at a specified 5-year age group and sex being diagnosed with cancer within the next 10, 20, 30 years or within their remaining lifetime. The lifetime was restricted to age 85 for these analyses.

Interpreting the Data

When interpreting cancer incidence and mortality data in this report, it is important to consider the following:

Border Areas and Neighboring States

Some areas of Massachusetts appear to have low cancer incidence, but this may be due to loss of cases in Massachusetts residents who were diagnosed in neighboring states and not reported to the MCR. Presently the MCR has reciprocal reporting agreements with the following fifteen states: Alaska, Arkansas, Connecticut, Florida, Maine, Mississippi, New Hampshire, New York, North Carolina, Rhode Island, South Carolina, Texas, Vermont, Wisconsin, and Wyoming.

Cases Diagnosed in Non-Hospital Settings

During the time period covered by this report, the MCR's information sources for most newly diagnosed cases of cancer were hospitals. In addition, the MCR collected information from reporting hospitals on cases diagnosed and treated in staff physician offices, when this information was available. In 2001, dermatologists and dermatopathology laboratories were added as reporting sources. The addition of these new reporting sources may elevate the incidence of melanoma diagnosed in the years 2001 and later. In 2002, urologists' offices and a general laboratory were added as reporting sources. Some types of cancer in this report, such as prostate cancer, may be under-reported because they are diagnosed primarily by private physicians, private laboratories, health maintenance organizations, or radiotherapy centers that escape the case

identification systems used by hospitals. The extent of this under-reporting has not been determined exactly, but cases included in this report represent the great majority of cases statewide and provide an essential basis for evaluating statewide cancer incidence patterns.

Definition of Cancer Sites

Note: including in situ cases in urinary bladder cancer incidence has elevated both the number of cases and rates for this site and for all sites combined compared to reports prior to 1997-2001.

The implementation of ICD-O-3 coding in 2001, and corresponding cancer site recodes, has changed the incidence of some types of tumors, especially ovarian cancer, leukemias, and lymphomas. These changes may affect annual site-specific incidence, causing a drop or spike in 2001-2004 rates, as well as the incidence of all sites combined and average annual incidence rates. Therefore, caution should be exercised when comparing rates in 2001-2004 with those for previous years.

Trends

Trend data should be interpreted with caution. Apparent increases or decreases in cancer incidence over time may reflect changes in diagnostic methods or case reporting rather than true changes in cancer occurrence. Also, cancer incidence trends may appear more favorable than they actually are because they have not been adjusted for reporting error or delay (10). Typically, statewide Massachusetts cancer incidence data are released about two years after a diagnosis year; for example, data for 2004 diagnoses are being released for the first time in 2007. The MCR continues to receive case reports on an ongoing basis even after the data are released. These delayed case reports, as well as corrections to cases based on subsequent details from the reporting facilities, result in reporting delay and error; the more recent diagnosis years may be less complete than the earlier diagnosis

years. Finally, the following should be considered when interpreting trend data:

- The EAPC assumes that the change in rate is the same over the entire time period examined, which may or may not be true for the trends examined in this report.
- If the percent difference in rates between year 2000 and year 2004 is small, the statistical significance of the EAPC may have no practical importance.

Race/Ethnicity

Race/ethnicity data for cancer cases are based on information in the medical record. Race/ethnicity

data for cancer deaths are based on information from death certificates as reported by next-of-kin and funeral directors. Errors in these source documents may lead to incorrect classification of race/ethnicity. Also, completeness of the race/ethnicity data may be different for cancer cases and cancer deaths. Some race/ethnicity categories may be under-reported if race/ethnicity is not available for all cases. Counts and rates may under-represent the true incidence of cancer in some racial/ethnic populations. The NAACCR Hispanic Identification Algorithm (NHIA) has been implemented in this report to help classify Hispanic ethnicity.

Table A.
North American Association of Central Cancer Registries (NAACCR) Certification Results
for the Massachusetts Cancer Registry (MCR)

Registry Element	Gold Standard	Silver Standard	MCR Results By Year					Standard Achieved
			2000	2001	2002	2003	2004	
Completeness of case ascertainment*	95%	90%	>95%	>95%	>95%	>95%	>95%	Gold
Unknown "age at diagnosis"	≤2%	≤3%	0.0%	0.0%	0.0%	0.0%	0.0%	Gold
Unknown "sex"	≤2%	≤3%	0.0%	0.0%	0.0%	0.0%	0.0%	Gold
Unknown "race"	≤3%	≤5%	2.7%	1.9%	1.3%	1.4%	1.4%	Gold
Death certificate only cases†	≤3%	≤5%	1.9%	1.7%	1.5%	1.6%	1.8%	Gold
Duplicate primary cases	≤0.1%	≤0.2%	0.03%	0.04%	0.04%	0.02%	0.05%	Gold
Timeliness	Data submitted within 24 months of close of calendar year.							Gold

* Completeness of case ascertainment was estimated by methods from the NAACCR.

† Death certificate only cases are cases that are identified through the death certificate clearance process and only have information from a death certificate.

OVERVIEW

OVERVIEW

In Massachusetts, from 2000 through 2004, there were 174,719¹ newly diagnosed cases of cancer – 88,132 in males and 86,578 in females. For all types of cancer combined for 2000-2004, the average annual age-adjusted incidence rate among males was 604.8 cases per 100,000 and the average annual age-adjusted incidence rate among females was 455.4 cases per 100,000.

During the same time period, there were 68,485 deaths due to cancer – 33,943 males and 34,542 females. For all types of cancer combined for 2000-2004, the age-adjusted mortality rate was 241.6 deaths per 100,000 for males and 169.2 deaths per 100,000 for females.

Leading Types of Cancer

Incidence

Males

The most commonly diagnosed type of cancer in Massachusetts males from 2000-2004 was prostate cancer, followed by cancers of the bronchus and lung, colon/rectum, and urinary bladder. These four cancer types comprised about 62% of newly diagnosed cases. Prostate cancer comprised 29% of all male incident cases (Figure 1).

From 2000-2004, the age-adjusted incidence rates for these four leading types of cancer were 176.1 cases per 100,000 for prostate cancer, 85.8 cases per 100,000 for cancer of the bronchus and lung, 69.0 cases per 100,000 for colon/rectum cancer, and 46.8 cases per 100,000 for urinary bladder cancer. Other leading cancer types for males included melanoma, non-Hodgkin lymphoma, cancer of the kidney and renal pelvis, cancer of the oral cavity and pharynx, leukemia, and pancreatic cancer (Figure 2).

Females

Among Massachusetts females, the most commonly diagnosed cancer types were cancers of the breast, bronchus and lung, colon/rectum, and corpus uteri (uterus), representing about 60% of new cancer cases during 2000-2004. Breast cancer comprised 29% of all female incident cases (Figure 1).

From 2000-2004, the age-adjusted incidence rates for these four leading types of cancer were 136.7 cases per 100,000 for breast cancer, 62.1 cases per 100,000 for cancer of the bronchus and lung, 49.4 cases per 100,000 for colon/rectum cancer, and 28.3 cases per 100,000 for cancer of the uterus. Other leading cancer types for females included non-Hodgkin lymphoma, melanoma, ovarian cancer, thyroid cancer, urinary bladder cancer, and pancreatic cancer (Figure 2).

Mortality

Males

Cancer of the bronchus and lung was the leading cause of cancer death for Massachusetts males between 2000 and 2004. During this time period, cancer of the bronchus and lung accounted for 29% of all cancer deaths in males. Prostate cancer ranked second in mortality for males. The third and fourth most common causes of cancer death were cancers of the colon/rectum and pancreas, respectively. These four types of cancer comprised 55% of all cancer deaths for this time period (Figure 3).

From 2000 to 2004, the age-adjusted mortality rates for the four leading causes of cancer death were 68.5 deaths per 100,000 for cancer of the bronchus and lung, 27.4 deaths per 100,000 for prostate cancer, 24.6 deaths per 100,000 for colon/rectum cancer, and 13.0 deaths per 100,000 for pancreatic cancer. Other leading causes of cancer death for males during this time period included cancer of the esophagus, non-Hodgkin lymphoma, leukemia, and cancers of the urinary bladder, liver and intrahepatic bile ducts, and stomach (Figure 4).

¹ The male and female case counts will not add up to the total case count because the MCR collects two additional gender classifications (transsexuals and persons with sex chromosome abnormalities/hermaphrodites).

Females

Cancer of the bronchus and lung was also the leading cause of cancer death for Massachusetts females between 2000 and 2004. During this time period, this cancer accounted for 25% of all cancer deaths in females. Breast cancer ranked second in mortality for females. The third and fourth most common causes of cancer death were cancers of the colon/rectum and pancreas, respectively. These four types of cancer comprised approximately 57% of all cancer deaths for this time period (Figure 3).

From 2000 to 2004, the age-adjusted mortality rates for these four leading causes of cancer death were 44.6 deaths per 100,000 for cancer of the bronchus and lung, 25.6 deaths per 100,000 for breast cancer, 17.0 deaths per 100,000 for colon/rectum cancer, and 10.1 deaths per 100,000 for pancreatic cancer. Other leading causes of cancer death for females during this time period included cancer of the ovary, non-Hodgkin lymphoma, leukemia, and cancers of the uterus, brain and other nervous system, and stomach (Figure 4).

Cancer Incidence Patterns by Age

The likelihood of being diagnosed with cancer increased steadily with age for many cancers. The age-specific incidence rate for all sites combined for males rose from 22.5 per 100,000 in the age group 0-4 to 3,332.7 per 100,000 in the age group 80-84 (Table 1). For females, the age-specific rate for all sites combined increased from 22.8 per 100,000 for ages 0-4 to 2,124.3 for ages 80-84 (Table 2). The cancer incidence rate for people aged 85 and above declined for both males and females (Tables 1 and 2).

The median age of diagnosis with any type of cancer in the period 2000-2004 was 68 years for males and 67 years for females (Tables 1 and 2). For many of the cancer types presented in this report, the median age at diagnosis was age 60 or older. The following cancers were diagnosed at a younger median age (males and females combined for cancers occurring in both sexes): brain and other nervous system (median age – 57), breast *in situ* (median age – 56), cervix (median age – 50),

Hodgkin lymphoma (median age – 38), testis (median age – 35), and thyroid (median age – 47) (Tables 1-3).

Cancer Trends

Incidence

From 2000 to 2004, overall cancer incidence in Massachusetts remained unchanged for females and decreased slightly for males. Though cancer rates fluctuated by year, the average annual percentage change in incidence rates was unchanged for females and decreased an average of 1.6% per year for males. Nationally, cancer incidence rates for all cancer sites combined decreased by 0.4% for males from 1999 to 2003, and by 0.1% for females, with neither decrease being statistically significant (11). Incidence trends in the leading cancers affecting Massachusetts males and females are discussed below. See Figures 5 and 6 for incidence trends and Tables 4, 5, and 6 for annual age-adjusted incidence rates over the years 2000-2004.

All of the data describing percent increases and decreases per year are based upon the estimated annual percent change (EAPC). New sources of data collection, such as dermatology offices and dermatopathology laboratories, the inclusion of *in situ* cases in incidence of urinary bladder, and the implementation of the ICD-O-3 coding system in 2001 may affect the EAPC for melanoma, urinary bladder, leukemias, lymphomas, ovarian cancer, and all sites combined and may not reflect true change in incidence.

Males

Among Massachusetts males between 2000 and 2004, the incidence rate of prostate cancer decreased by 5.5% per year, a statistically significant decrease (Figure 5). The 2000 incidence rate of prostate cancer was 191.5 cases per 100,000 males, and decreased to 156.0 cases per 100,000 males in 2004 (Table 4). In addition, there was an overall decrease in prostate cancer from its peak incidence of 217.4 per 100,000 in 1992. The national increase in prostate cancer incidence during the late 1980s and early 1990s is attributed to changes in diagnostic methodology

and increased prostate-specific antigen (PSA) screening (12).

The age-adjusted incidence rate declined by 1.7% per year (Figure 5) for cancer of the bronchus and lung, the second most commonly diagnosed cancer in males, though the decrease was not statistically significant. The incidence rate for cancer of the bronchus and lung fell from 87.7 cases per 100,000 males in 2000 to 82.6 cases per 100,000 in 2004 (Table 4). Nationally the incidence rates for cancer of the lung and bronchus declined significantly by 1.7% from 1995 to 2003 (11).

The incidence rate of colorectal cancer decreased from 68.9 cases per 100,000 males in 2000 to 64.7 cases per 100,000 in 2004. The estimated annual percent decrease was small (2.0%) and not statistically significant (Figure 5). The national data show that colorectal incidence rates decreased significantly by 1.3% from 1995 to 2003 for males (11).

The incidence data for cancer of the urinary bladder include both *in situ* and invasive tumors. Incidence rates fluctuated over the years 2000-2004 with an average annual non-statistically significant decrease of 1.0% per year. In 2000, 48.2 males per 100,000 were diagnosed with cancer of the urinary bladder; by 2004, the incidence rate was 45.0 per 100,000 (Table 4). A more detailed analysis of bladder cancer incidence is presented in this report in the special section entitled "Urinary Bladder Cancer".

Incidence rates of thyroid cancer and cancers of the kidney and renal pelvis increased significantly from 2000 to 2004 among males in Massachusetts (13.0% and 3.1%, respectively) (Figure 5).

Females

Invasive breast cancer incidence decreased significantly by 2.1% per year during the period 2000-2004 (Figure 6). The incidence rate decreased from 144.3 cases per 100,000 females in 2000 to 133.9 cases per 100,000 in 2004 (Table 5). Nationally, breast cancer incidence rates decreased non-significantly by 0.5% from 1995-2003 (11). Rising breast cancer incidence during

the 1990s has been attributed to increased mammography screening (13).

The incidence of cancer of the bronchus and lung increased by 0.6% per year; this increase was not statistically significant. The rate changed from 61.0 cases per 100,000 females in 2000 to 63.0 cases per 100,000 in 2004 (Table 5). The national rate of cancer of the bronchus and lung among females increased significantly by 0.5% from 1995 to 2003 (11).

The rate of colorectal cancer, which is the third most common cancer among Massachusetts females, decreased by 2.3% per year from 2000 through 2004, though the decrease was not statistically significant. The Massachusetts incidence rate was 49.5 per 100,000 in 2000 and 46.5 per 100,000 in 2004. Nationally, the rates for colorectal cancer decreased non-significantly by 0.9% from 1995-2003 (11).

The annual rate for uterine cancer, the fourth most common cancer among Massachusetts females, increased over the years 2000 to 2004, with a non-statistically significant increase of 2.9% per year (Figure 6). Nationally, the rates for uterine cancer decreased significantly by 0.1% from 1995-2003 (11).

There were statistically significant trends from 2000 to 2004 for thyroid cancer. In Massachusetts, thyroid cancer incidence rates increased by 10.6% per year. Nationally, the rates for thyroid cancer in females increased significantly by 5.9% from 1995-2003 and by 9.1% from 2000-2003. These increases have been observed in the U.S. as well as globally. Although changes in diagnostic procedures, including the introduction and greater use of ultrasound and fine-needle biopsy have likely contributed to the incidence increase, more research on the relationship between temporal trends, diagnostic procedures, and exposure to radiation and other potential risk factors is needed (11).

In addition to the changes mentioned above, ovarian cancer decreased significantly by 2.4% per year for 2000-2004 in Massachusetts and 1.7% per year nationally for 1995-2003 (11).

Mortality

Cancer mortality for all sites combined from 2000 to 2004 decreased annually by 2.9% per year for males and 1.7% per year for females, both statistically significant decreases (Figures 5 and 6). Recent national data for all cancer sites combined show statistically significant declines in mortality rates by 1.6% per year for men and 0.9% for women from 1999-2003 (11).

Males

Among males, mortality from bronchus and lung, prostate, and colon/rectum cancers all decreased at statistically significant levels from 2000 to 2004, with a 6.4% per year decrease for prostate cancer, a 2.6% per year decrease for cancer of the bronchus and lung and a 7.1% per year decrease for colon/rectum cancer. Other significant decreases in mortality among males included deaths from cancer of the stomach, which decreased 9.7% per year, and deaths from cancers of the brain and nervous system, which decreased by an average of 5.1% per year (Figure 5). Nationally, from 1995 to 2003, these five cancers all exhibited statistically significant rate decreases: prostate by 4.1% per year, lung and bronchus cancer by 2.0% per year, colorectal cancer by 2.1% per year, stomach cancer by 3.7% per year, and brain and nervous system cancers by 0.8% per year (11).

Females

For females, the bronchus and lung cancer mortality rate decreased non-significantly by 0.2% annually, while breast cancer mortality decreased significantly by 3.0% per year. The colon/rectum cancer mortality rate declined for females by 3.8% per year, which was not significant. Nationally from 1995 to 2003, breast cancer mortality rates decreased significantly by 2.3%, bronchus and lung cancer rates increased non-significantly by 0.3% and colon/rectum cancer rates decreased significantly by 2.0% (11).

It is important to note that the mortality rates for most cancers with significant increases or decreases are low (Tables 7 and 8). A trend based on a small number of deaths may not be stable

over a longer period. As a result, the statistical significance of EAPC for these sites may have no practical importance.

Cancer Patterns by Race/Ethnicity

Incidence

Table 10 presents the five leading cancers (based on age-adjusted rates) by race/ethnicity and sex. Tables 11, 12, and 13 present the distribution of cases by cancer type for all races combined and by race/ethnicity groups for males, females, and all sexes for the period 2000-2004. Age-adjusted rates for all races combined and by race/ethnicity, cancer type, and sex are presented in Tables 14, 15, and 16. The tables include age-adjusted rates surrounded by the 95% confidence intervals or limits (95% CL). See the Methods section of this report for more information about confidence intervals.

Overall, of the total 174,719 newly diagnosed cancer cases during 2000-2004, 159,112 occurred in white, non-Hispanics, 6,098 in black, non-Hispanics, 2,465 in Asian, non-Hispanics, and 4,258 in Hispanics (Table 13). The remaining 2,786 cases occurred in American Indians or those whose race/ethnicity was unknown.

Males

Among males, the top three most commonly diagnosed cancers were the same for each male race/ethnicity category. These top three cancers were prostate cancer, cancer of the bronchus and lung, and cancer of the colon/rectum. Cancer of the urinary bladder ranked fourth for all Massachusetts male race/ethnicity categories except Asian, non-Hispanics. The fourth most commonly diagnosed cancer for Asian, non-Hispanic males was cancer of the liver and intrahepatic bile ducts. Stomach cancer was the fifth most commonly diagnosed cancers for all male race/ethnicity categories except white, non-Hispanic. The fifth most commonly diagnosed cancer among white non-Hispanic males was melanoma (Table 10).

From 2000 to 2004, black, non-Hispanic males had the highest incidence rate of all cancer types

combined (635.9 per 100,000). This rate was significantly higher than the rates for other race/ethnicity groups ($p \leq 0.05$). Asian, non-Hispanic males had the lowest incidence rate of all sites combined (325.8 per 100,000) ($p \leq 0.05$). Black, non-Hispanic males had the highest rate of prostate cancer (271.8 per 100,000), which was significantly higher than the prostate cancer rates for other race/ethnicity groups. Nationally, prostate cancer incidence was 56 percent higher in black men than in white men (13). Asian, non-Hispanic men in Massachusetts had the highest rate of liver cancer. The rate was 28.6 per 100,000, versus 9.1 per 100,000 for all races combined ($p \leq 0.05$) (Table 14).

Females

Based on age-adjusted rates, breast cancer was the most commonly diagnosed cancer for each female race/ethnicity category. Cancer of the bronchus and lung was the second leading cancer for white, non-Hispanic and black, non-Hispanic females, but the third leading cancer for Asian, non-Hispanic and Hispanic females. Cancer of the colon/rectum was the third leading cancer for white, non-Hispanic and black, non-Hispanic females, but the second leading cancer for Asian, non-Hispanic and Hispanic females. Cancer of the corpus uteri (uterus) was the fourth leading cancer site for all race/ethnicity groups, except Asian, non-Hispanic females. Thyroid cancer was the fourth most common cancer for Asian, non-Hispanic females. Non-Hodgkin lymphoma was the fifth most frequent cancer in black, non-Hispanic and Hispanic females. Melanoma was the fifth most commonly diagnosed cancer in white, non-Hispanic females, and cancer of the corpus uteri was the fifth most commonly diagnosed cancer in Asian, non-Hispanic females, respectively (Table 10).

During 2000-2004, white, non-Hispanic females had the highest incidence rate of all cancer types combined (462.5 per 100,000) among all race/ethnicity groups. This rate was significantly higher than the rates for the other race/ethnicity groups ($p \leq 0.05$). Asian, non-Hispanic females had the lowest incidence rate of all sites combined (270.1 per 100,000) ($p \leq 0.05$). The invasive breast and lung cancer incidence rates were statistically

significantly higher for white, non-Hispanic females, 140.2 and 64.1 cases per 100,000, respectively, than the other race/ethnicity groups. The breast cancer *in situ* incidence rate was also statistically significantly higher among white, non-Hispanic females (Table 15).

Mortality

Table 17 presents the five leading causes of cancer mortality by race/ethnicity and sex. The number of cancer related deaths, age-adjusted mortality rates, and 95% confidence intervals by cancer type, race/ethnicity and sex are presented in Tables 18 through 23.

Of the 68,485 deaths from cancer between 2000 and 2004, 64,050 occurred among white, non-Hispanics, 2,654 among black, non-Hispanics, 746 among Asian, non-Hispanics and 970 among Hispanics (Table 20). Overall death rates were the highest in the black, non-Hispanic population, which is consistent with national data (11).

Males

For Massachusetts males, cancer of the bronchus and lung was the most common cause of cancer death among all male race/ethnicities based on age-adjusted rates. Cancer of the prostate was the second leading cause of cancer death among white, non-Hispanic, black, non-Hispanic, and Hispanic males. Cancer of the liver and intrahepatic bile ducts was the second leading cause of cancer death for Asian, non-Hispanic males. Cancer of the colon/rectum was the third most common cause of cancer death in all male race/ethnicity groups (Table 17).

For all types of cancer combined for 2000-2004, black, non-Hispanics had the highest age-adjusted mortality rate among males, with 301.0 deaths per 100,000 males. This was significantly higher than the rates for the three other racial/ethnic groups. Black, non-Hispanics had significantly higher mortality rates of the following cancers as compared to white, non-Hispanics: lung cancer (80.0 per 100,000 males vs. 69.7 per 100,000), liver cancer (12.4 per 100,000 vs. 6.6 per 100,000), multiple myeloma (7.7 per 100,000 vs. 4.4 per 100,000), prostate cancer (56.9 per

100,000 vs. 27.1 per 100,000), and stomach cancer (15.0 per 100,000 vs. 6.4 per 100,000). Mortality data were limited for both Asian, non-Hispanics and Hispanics due to small numbers, but Asian non-Hispanic males had the highest mortality rate of cancer of the liver and intrahepatic bile ducts, 16.1 per 100,000 (Table 21). This rate was significantly higher than that of white, non-Hispanics, but not those of the other two racial/ethnic groups.

Females

Cancers of the bronchus and lung, breast, and colon/rectum were the three most common causes of cancer death for all Massachusetts female race/ethnicities, although the ranking of those cancers differed among the race/ethnicity categories. Cancer of the bronchus and lung was the most common cause of cancer death for all female race/ethnicities in Massachusetts, except Hispanics. Breast cancer was the most common cause of death for Hispanic females, although the mortality rate for cancer of the bronchus and lung was only slightly lower than that for breast cancer (12.6 vs. 12.1 per 100,000 respectively) (Table 17).

For all types of cancer combined for 2000-2004, black, non-Hispanic females had the highest age-adjusted mortality rate among females with 176.2 deaths per 100,000 females. White, non-Hispanic females had significantly elevated mortality rates of lung cancer (46.5 per 100,000) compared with the other racial/ethnic groups. Breast cancer mortality rates were comparable between black and white, non-Hispanic females, but these groups had significantly elevated rates when compared with Asian, non-Hispanics and Hispanics. The mortality rate from colon/rectum cancer was statistically significantly higher in white, non-Hispanic and black, non-Hispanic females compared to the two other racial/ethnic groups (Table 22).

Massachusetts Compared to the U.S.

Age-adjusted incidence and mortality rates in Massachusetts are compared to national rates in Table 24. The national incidence and mortality data are from the North American Association of

Central Cancer Registries (NAACCR). It is important to interpret these data cautiously. Cancer rates may be affected by differences in the racial/ethnic composition of the population, differences in population estimates, the prevalence of cancer risk factors, and cancer screening rates. Cancer rates in Massachusetts and NAACCR areas or the United States may differ because of these variations. Massachusetts incidence and mortality data, NAACCR incidence data, and United States mortality data all represent cancer cases and deaths from 2000-2004.

Incidence

The NAACCR incidence data represent about 77% of the U.S. population, including 78% of whites, 69% of blacks, 87% of Asian/Pacific Islanders, and 76% of Hispanic/Latinos (4). For all cancer sites combined and for both sexes, the age-adjusted incidence rates were higher in Massachusetts than in the NAACCR areas. The incidence rates in Massachusetts were slightly higher than the incidence rates in the NAACCR areas for leading cancers: female bronchus and lung, male and female colon/rectum, female breast, prostate, and uterine cancer. Lung cancer incidence among males was lower in Massachusetts than in the NAACCR areas (85.8 versus 89.0 per 100,000 males). Female breast *in situ* cancer incidence was higher in Massachusetts than in NAACCR registries (47.5 versus 29.1 per 100,000 females). The incidence rate of cervical cancer in Massachusetts was lower than the incidence rate in the NAACCR registries (6.5 per 100,000 versus 8.8 per 100,000) (Table 24).

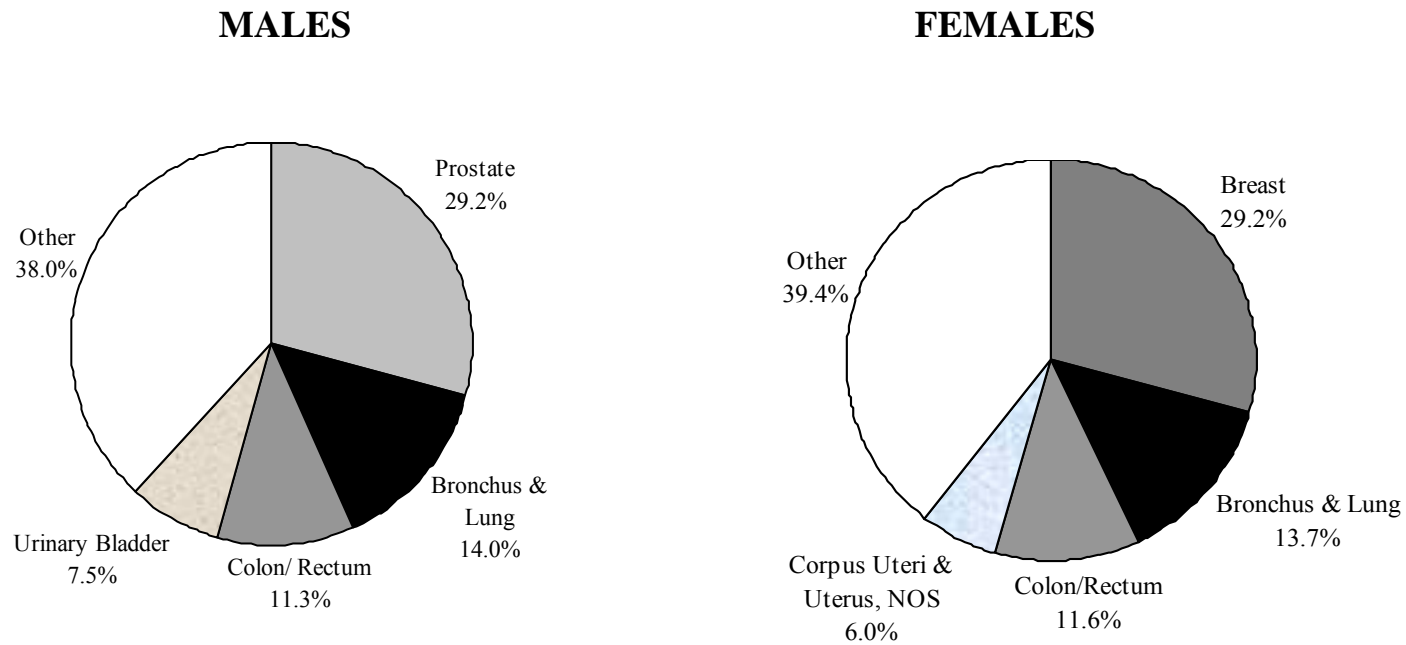
Mortality

The national mortality data cover the entire United States population.

For males, the age-adjusted mortality rate in Massachusetts was slightly higher than the age-adjusted mortality rate in the United States for all cancer sites combined, 241.6 per 100,000 versus 238.7 per 100,000 for males. For females, the age-adjusted mortality rate for all cancer sites combined in Massachusetts was slightly higher than the national rate (169.2 per 100,000 versus 162.2 per 100,000, respectively) (Table 24).

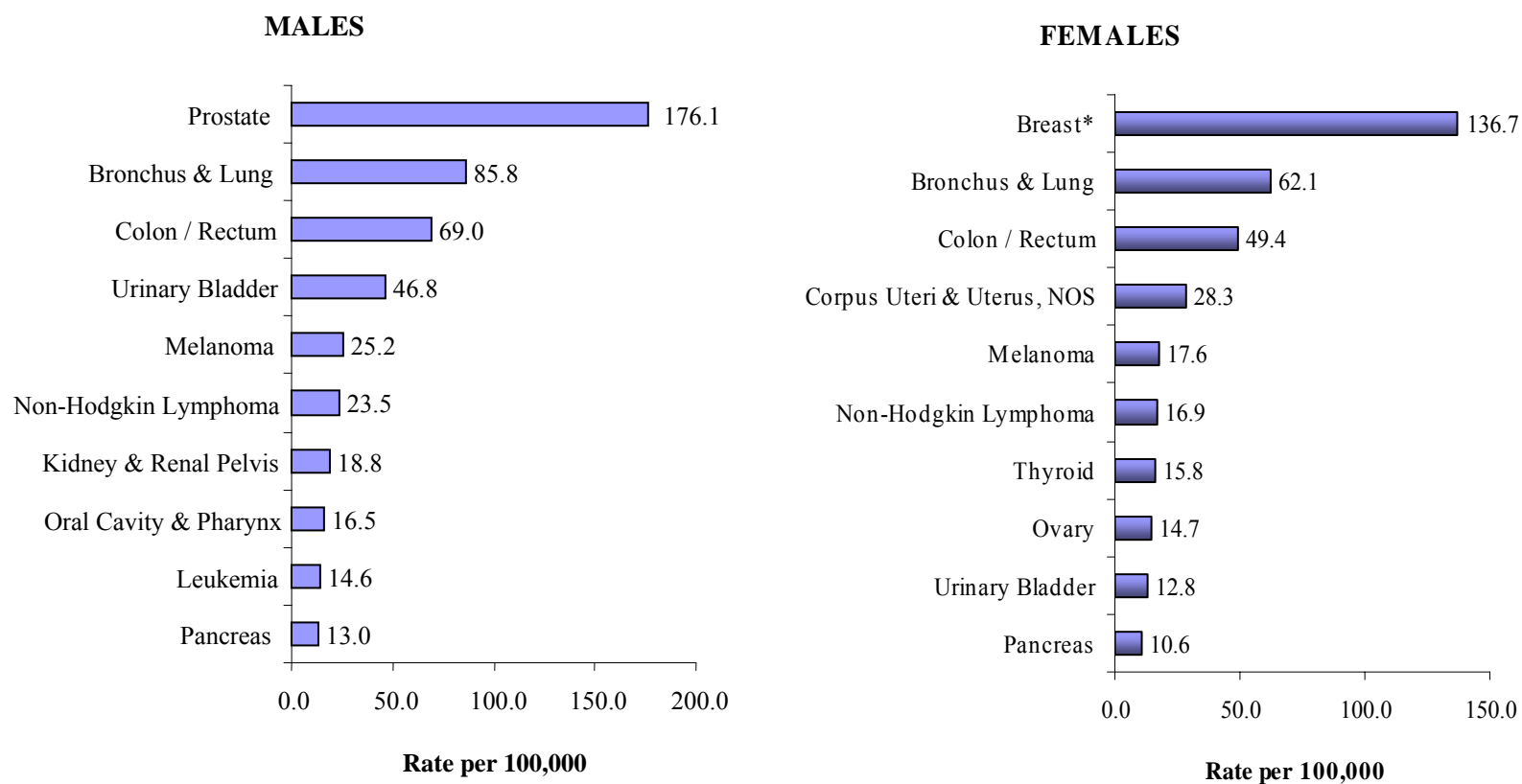
FIGURES & TABLES

Figure 1.
CANCER INCIDENCE CASES BY CANCER TYPE AND SEX
Massachusetts, 2000-2004



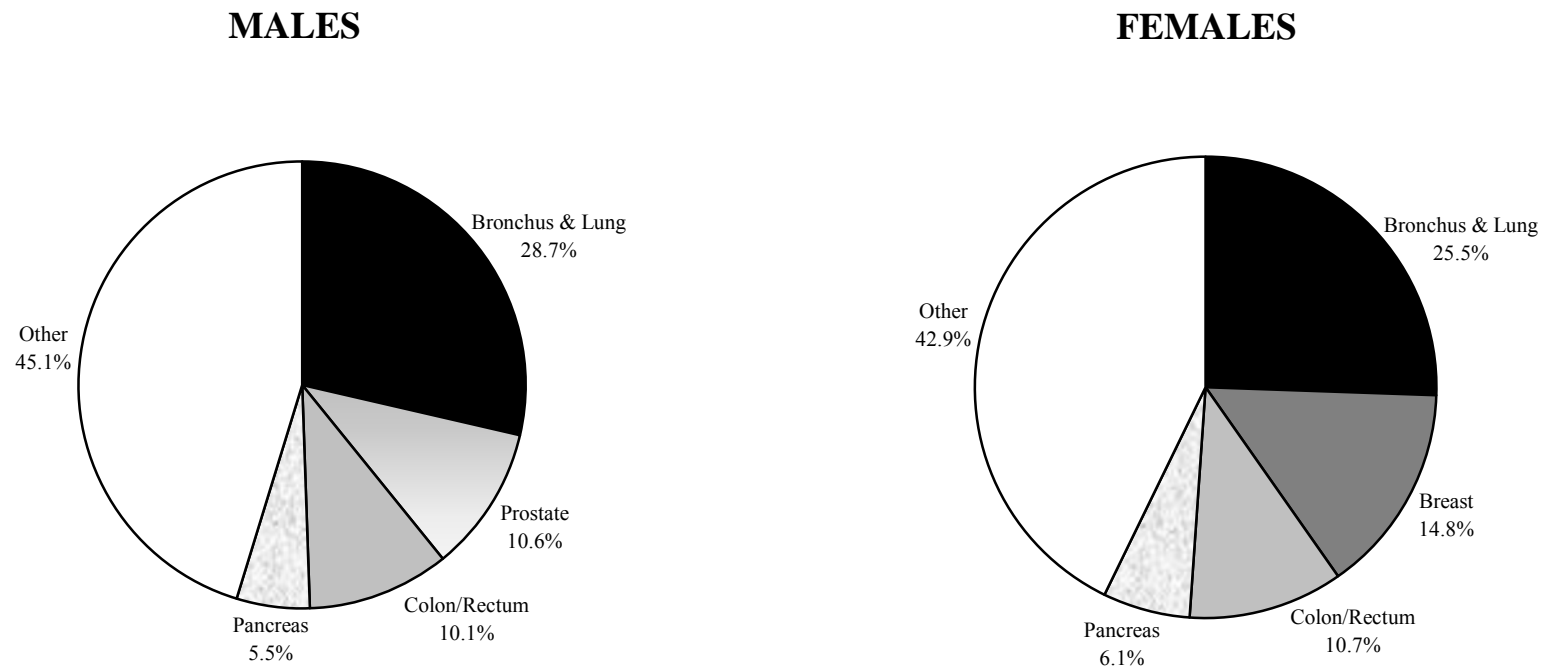
Source: Massachusetts Cancer Registry

Figure 2.
INCIDENCE RATES¹ FOR TEN LEADING CANCER TYPES BY SEX
Massachusetts, 2000-2004



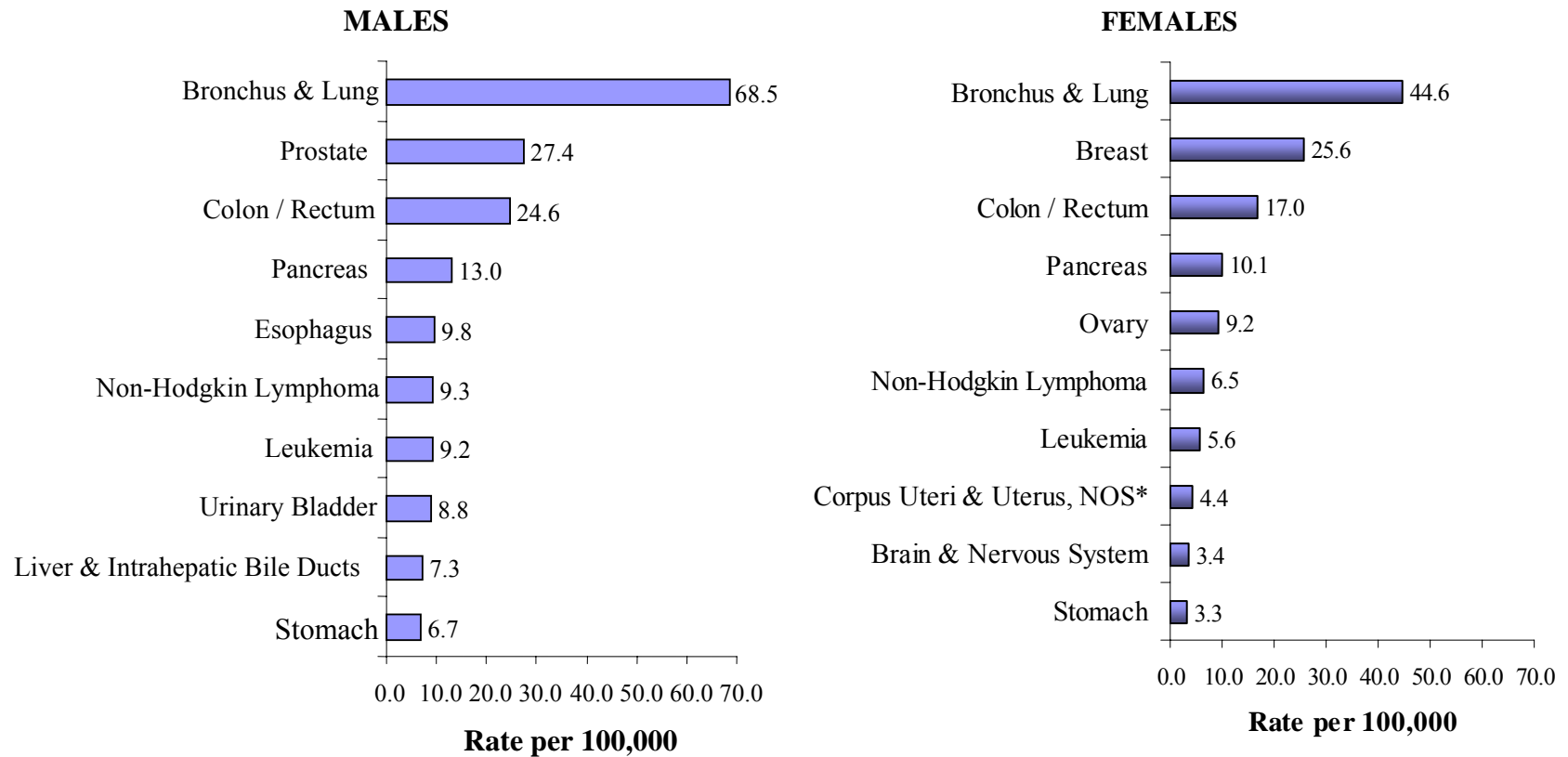
¹ Rates are age- adjusted to the 2000 U.S. Standard Population. * Breast cancer rates do not include *in situ* cases.

Figure 3.
CANCER MORTALITY CASES BY CANCER TYPE AND SEX
Massachusetts, 2000-2004



Source: Massachusetts Cancer Registry

Figure 4.
MORTALITY RATES¹ FOR TEN LEADING CANCER TYPES BY SEX
Massachusetts, 2000-2004



¹ Rates are age- adjusted to the 2000 U.S. Standard Population. *NOS –Not Otherwise Specified.

Source: Massachusetts Cancer Registry

Table 1.
AGE-SPECIFIC INCIDENCE RATES¹ AND MEDIAN AGES FOR SELECTED CANCER SITES
Massachusetts, 2000-2004
MALES

Cancer Site/Type	Age Groups																		Median
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	Age
All Sites	22.5	12.3	13.9	23.2	36.8	53.5	67.8	97.7	160.6	302.2	625.3	1105.9	1765.3	2540.6	3180.5	3356.8	3332.7	3007.4	68
Brain & Other Nervous System	4.8	4.3	3.2	3.4	2.2	3.2	2.9	4.4	6.2	9.1	10.3	16.4	17.2	20.7	30.7	28.7	31.5	22.8	56
Breast	- ³	-	-	-	-	-	0.1	0.1	0.5	0.7	1.4	2.3	4.0	7.3	6.4	7.2	8.1	8.3	68
Breast <i>In Situ</i> ²	-	-	-	0.2	-	-	-	0.1	0.1	0.3	0.3	0.5	0.5	1.0	0.7	0.3	1.6	-	61
Bronchus & Lung	-	-	-	0.2	0.2	1.4	1.9	4.5	15.5	31.3	66.1	133.3	237.6	377.6	528.9	585.9	557.1	409.1	71
Colon / Rectum	0.1	-	0.2	0.4	0.8	2.2	4.2	7.5	15.7	31.2	68.2	110.3	171.4	261.5	355.6	425.8	508.7	468.5	70
Esophagus	-	-	-	-	-	0.2	0.6	0.9	2.6	6.9	13.3	23.7	35.9	47.9	61.8	59.2	72.6	55.0	68
Hodgkin Lymphoma	0.1	0.7	1.5	3.1	5.9	6.4	3.4	4.9	3.9	4.1	2.8	3.3	4.1	4.6	6.0	5.1	7.3	4.4	39
Kidney & Renal Pelvis	1.8	0.7	0.1	0.1	0.3	0.6	2.2	4.5	10.1	13.1	28.4	38.4	60.7	75.7	84.7	92.1	92.4	57.2	65
Larynx	-	-	-	-	-	-	0.3	0.9	1.6	4.4	8.5	19.0	24.7	33.4	39.4	37.0	35.1	31.1	66
Leukemia	7.3	3.5	3.3	3.4	2.8	3.2	3.7	3.7	5.0	8.4	11.9	20.7	31.6	42.5	61.8	80.1	90.0	81.6	66
Liver & Intrahepatic Bile Ducts	0.7	-	0.1	-	0.3	0.3	0.7	1.1	2.8	11.0	18.6	17.9	25.5	34.8	42.1	42.8	36.7	33.3	64
Melanoma of Skin	0.1	0.1	0.5	1.8	3.1	6.0	9.0	13.0	17.1	22.7	36.3	42.7	61.2	80.9	101.2	107.1	121.8	122.7	63
Multiple Myeloma	-	-	-	-	-	0.3	0.4	1.0	1.8	3.9	6.6	11.1	17.4	27.8	33.6	41.5	48.8	49.4	70
Non-Hodgkin Lymphoma	0.2	1.2	1.7	2.7	3.1	4.8	6.8	8.5	13.1	19.6	25.3	39.8	49.1	71.1	100.2	123.7	137.6	132.1	66
Oral Cavity & Pharynx	0.1	-	0.2	0.5	0.7	1.1	1.4	2.6	8.7	18.9	32.5	51.2	51.5	61.8	59.5	60.3	55.3	53.3	61
Pancreas	-	-	-	0.1	0.1	-	0.5	1.3	2.7	4.6	13.0	24.3	36.2	48.5	69.6	75.5	95.6	83.3	70
Prostate	-	-	-	0.1	-	0.1	0.2	0.7	10.4	53.1	189.5	409.6	683.6	992.0	1065.6	921.2	638.1	577.3	67
Stomach	-	-	-	-	0.3	0.7	1.1	1.7	3.3	5.9	9.4	14.3	29.5	42.3	56.8	73.1	96.8	97.7	71
Testis	0.3	-	0.1	3.6	10.7	13.1	15.4	15.2	10.3	8.0	3.9	2.1	1.5	2.1	1.8	1.9	-	1.7	35
Thyroid	0.1	0.2	0.4	0.5	1.9	2.6	4.6	6.4	6.5	7.2	9.2	9.9	12.6	14.9	11.7	11.5	7.3	3.3	52
Urinary Bladder	0.1	-	-	-	0.2	0.5	1.7	3.6	7.1	16.3	32.7	60.9	111.2	168.2	275.1	312.8	369.5	368.0	72
Other Sites	6.9	1.6	2.8	3.4	4.3	6.9	6.6	11.1	15.7	21.9	37.4	54.9	98.8	125.0	188.1	264.3	322.7	347.5	70

¹ per 100,000 ² Breast *in situ* is excluded from all sites ³ Dashed out age groups had no incident cases.
Source: Massachusetts Cancer Registry

Table 2.
AGE-SPECIFIC INCIDENCE RATES¹ AND MEDIAN AGES FOR SELECTED CANCER SITES
Massachusetts, 2000-2004
FEMALES

Cancer Site/Type	Age Groups																		Median
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	Age
All Sites	22.8	11.8	11.4	20.5	35.5	65.1	113.6	180.2	296.6	467.4	650.4	903.7	1211.2	1545.2	1807.9	2026.8	2124.3	1866.5	67
Brain & Other Nervous System	4.6	3.6	2.1	1.7	1.5	2.6	3.4	3.1	5.1	5.9	7.5	10.7	12.6	16.7	15.1	22.5	19	16.3	59
Breast	²	-	0.1	0.1	1.4	6.4	28.1	67.1	130.7	216.2	259.8	329.2	393.6	425.8	447.9	484.8	429.4	346.4	61
Breast <i>in situ</i>^{2s}	-	-	-	-	0.1	1.1	4.5	19.3	64.9	102.1	122.6	129.4	136.7	132.8	125.5	112.4	81.4	34.9	56
Bronchus & Lung	0.1	0.1	-	0.2	0.2	1.0	2.0	5.4	15.2	32.3	62.3	117.1	199.2	293.1	358	364	340	207.2	71
Cervix Uteri	0.1	-	-	0.3	1.2	3.9	8.0	9.2	12.8	9.0	11.8	10.4	11.4	12.3	12.1	11.9	10.5	9.1	50
Colon / Rectum			0.1	0.1	0.5	2.0	3.8	8.5	13.9	26.8	48.5	70.8	108	172.6	224.2	308.9	383.4	407.6	75
Corpus Uteri & Uterus, NOS	-	-	-	0.2	0.4	1.8	3.3	6.6	12.9	31.5	61.4	88.9	111.6	107.5	98.2	83.4	86.7	60.1	62
Esophagus	-	-	-	-	-	-	0.1	0.2	0.4	1.1	2.6	3.9	5.2	12.3	11.9	15.9	16.7	16.3	74
Hodgkin Lymphoma		0.1	2.0	4.2	5.8	4.4	5.2	3.5	2.8	1.5	2.1	1.9	1.8	2.5	4.0	4.8	4.4	2.2	35
Kidney & Renal Pelvis	1.8	0.8	0.4	0.2	0.6	0.7	1.1	2.0	5.5	8.7	13.3	19.9	25.4	38.0	44.2	46.0	47.5	30.3	68
Larynx	-	-	0.1	-	-	0.1	0.1	0.2	0.7	1.7	2.5	4.2	6.7	8.5	10.4	4.6	5.0	3.5	66
Leukemia	8.7	2.9	1.2	2.3	1.4	2.2	2.5	3.8	4.6	7.3	8.1	10.3	19.0	22.7	37.4	45.1	55.5	55.7	71
Liver & Intrahepatic Bile Ducts	0.3	0.1	-	-	0.1	0.5	0.2	0.1	0.7	1.8	3.0	5.1	5.3	10.8	11.4	12.8	16.0	18.8	72
Melanoma of Skin	0.1		0.4	1.8	5.5	11.5	16.3	17.1	18.6	23.9	26.5	30.4	35.6	42.7	50.6	52.8	46.3	46.2	57
Multiple Myeloma	-	-	-	-	-	0.1	0.2	0.2	0.9	1.8	4.2	7.0	10.1	14.4	24.1	25.3	29.1	22.3	74
Non-Hodgkin Lymphoma	0.5	0.5	0.9	1.0	1.9	3.7	4.7	6.0	8.8	12.0	16.7	29.4	41.4	57.9	70.9	89.5	108.2	78.9	71
Oral Cavity & Pharynx	-	0.2	0.1	0.5	0.6	1.4	1.6	2.3	3.5	6.6	10.9	13.3	19.0	21.1	29.0	27.3	25.0	27.4	66
Ovary	0.2	0.4	0.7	1.2	1.9	1.6	3.3	5.8	10.2	19.8	25.7	34.2	39.6	47.5	53	51.1	59.2	47.7	63
Pancreas	0.1	0.1	-	-	-	0.2	0.3	1.4	2.5	3.6	9.1	14.8	25.5	41.4	56.7	71.1	74.5	81.5	75
Stomach	-	0.1	-	-	0.1	0.4	0.8	1.1	2.0	3.2	3.4	6.0	8.9	14.8	24.6	30.4	45.2	55.2	77
Thyroid	-	0.1	0.8	3.4	9.3	15.6	21.3	25.9	27.5	27.3	27.0	23.9	24.0	23.6	17.9	17.6	13.3	8.4	46
Urinary Bladder	-	-	-	0.1	-	0.5	0.7	1.7	3.5	4.3	9.9	21.3	34.9	53.0	72.3	76.3	81.6	83.7	73
Other Sites	6.3	2.8	2.6	3.3	3.3	4.7	6.6	9.1	13.8	21.0	33.9	50.9	72.3	105.9	133.8	180.6	227.7	241.7	73

¹per 100,000 ²Breast *in situ* is excluded from all sites. ³Dashed out age groups had no incident cases.

Source: Massachusetts Cancer Registry

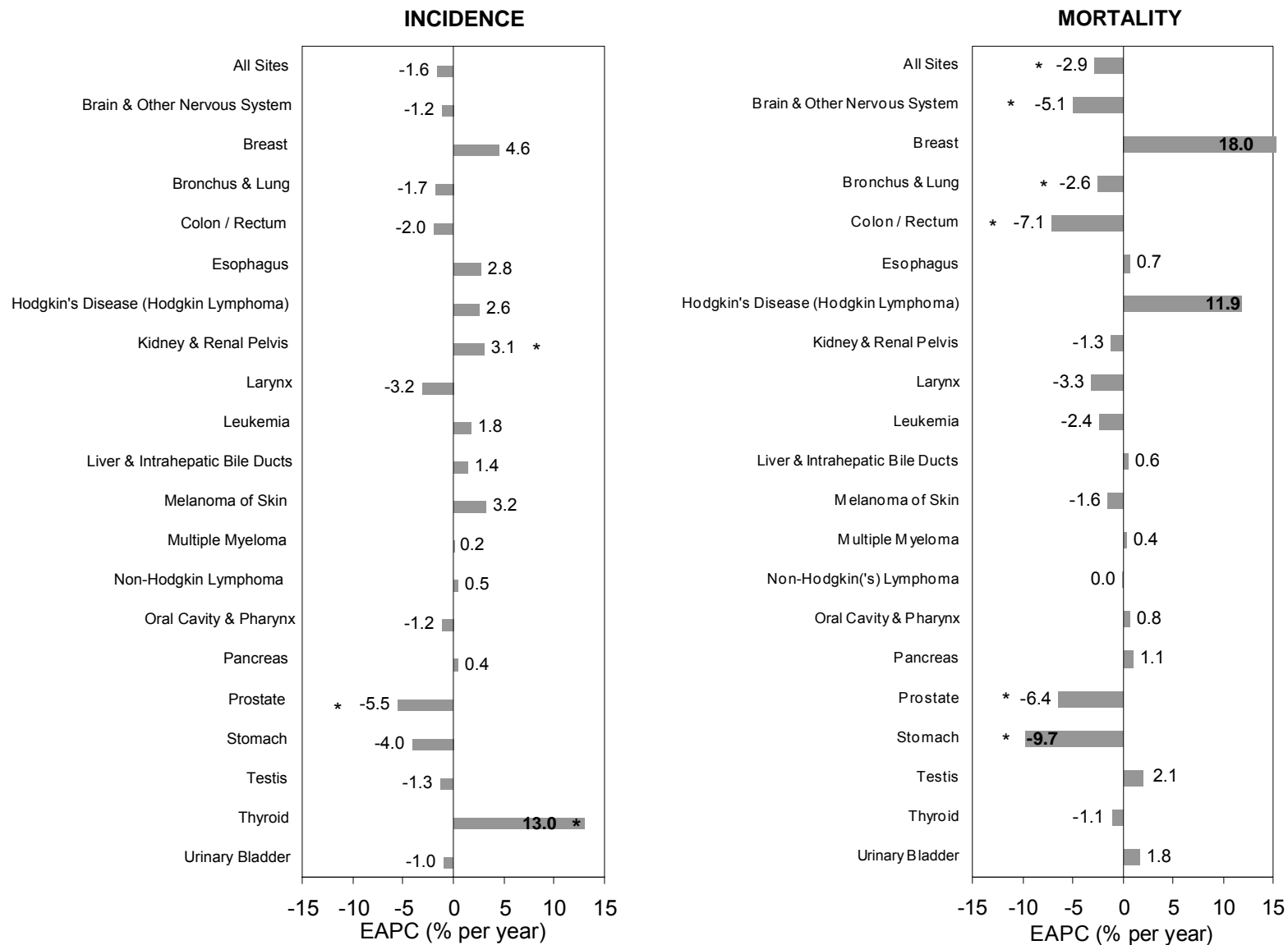
Table 3.
AGE-SPECIFIC INCIDENCE RATES¹ AND MEDIAN AGES FOR SELECTED CANCER SITES
Massachusetts, 2000-2004
TOTAL

Cancer Site/Type	Age Groups																		Median
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	Age
All Sites	22.7	12.1	12.7	21.9	36.1	59.5	91.1	139.5	229.8	386.9	638.3	1000.8	1473.3	2004.6	2403.8	2567.2	2562.5	2191.4	68
Brain & Other Nervous System	4.7	4.0	2.6	2.6	1.8	2.9	3.2	3.8	5.6	7.5	8.8	13.5	14.8	18.6	21.9	25.0	23.5	18.2	57
Breast	- ³	-	<0.1	<0.1	0.7	3.2	14.3	34.1	66.7	111.1	134.7	172.3	209.4	232.7	256.2	290.8	276.7	250.3	61
Breast <i>in situ</i>²	-	-	-	0.1	<0.1	0.6	2.3	9.8	33.0	52.4	63.4	67.5	72.3	72.0	71.4	66.8	52.5	25.0	56
Bronchus & Lung	0.1	<0.1	-	0.2	0.2	1.2	2.0	4.9	15.3	31.8	64.2	124.9	217.4	332.1	432.2	454.2	418.8	264.7	71
Cervix Uteri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colon / Rectum	0.1	-	0.1	0.2	0.6	2.1	4.0	8.0	14.7	29.0	58.1	89.8	138.0	213.6	281.3	356.4	428.8	424.9	73
Corpus Uteri & Uterus, NOS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Esophagus	-	-	-	-	-	0.1	0.3	0.6	1.5	4.0	7.8	13.4	19.7	28.7	33.6	33.5	37.0	27.3	69
Hodgkin Lymphoma	0.1	0.4	1.8	3.6	5.8	5.4	4.3	4.2	3.3	2.8	2.4	2.6	2.9	3.4	4.9	4.9	5.4	2.8	38
Kidney & Renal Pelvis	1.8	0.7	0.2	0.1	0.4	0.6	1.7	3.3	7.8	10.8	20.6	28.8	42.1	55.4	61.8	64.7	63.7	37.9	66
Larynx	-	-	<0.1	-	-	<0.1	0.2	0.5	1.1	3.0	5.4	11.3	15.2	20.0	23.0	17.7	15.9	11.4	66
Leukemia	8.0	3.2	2.3	2.9	2.1	2.7	3.1	3.8	4.8	7.8	10.0	15.3	25.0	31.9	48.0	59.3	68.0	63.1	68
Liver & Intrahepatic Bile Ducts	0.5	<0.1	<0.1	-	0.2	0.4	0.5	0.6	1.7	6.3	10.6	11.3	14.9	21.9	24.7	25.0	23.5	22.9	66
Melanoma of Skin	0.1	<0.1	0.4	1.8	4.3	8.8	12.7	15.1	17.9	23.3	31.3	36.3	47.7	60.3	72.5	74.9	73.7	67.9	60
Multiple Myeloma	-	-	-	-	-	0.2	0.3	0.6	1.4	2.8	5.4	9.0	13.5	20.6	28.2	31.9	36.3	30.0	72
Non-Hodgkin Lymphoma	0.4	0.9	1.3	1.8	2.5	4.3	5.7	7.2	10.9	15.7	20.8	34.4	45.1	64.0	83.7	103.4	119.0	94.0	68
Oral Cavity & Pharynx	0.1	0.1	0.1	0.5	0.7	1.2	1.5	2.4	6.1	12.6	21.4	31.5	34.3	39.9	42.2	40.7	36.0	34.8	62
Ovary	0.1	0.2	0.3	0.6	0.9	0.8	1.7	2.9	5.2	10.1	13.3	17.8	20.9	25.6	30.0	30.4	37.7	34.1	63
Pancreas	-	-	<0.1	0.1	-	0.1	0.4	1.3	2.6	4.1	11.0	19.4	30.6	44.7	62.3	72.9	82.2	82.0	72
Prostate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stomach	-	<0.1	-	-	0.2	0.5	1.0	1.4	2.6	4.5	6.3	10.0	18.6	27.5	38.6	47.8	63.9	67.3	74
Testis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thyroid	0.1	0.1	0.6	1.9	5.6	9.2	13.1	16.3	17.2	17.5	18.4	17.2	18.6	19.6	15.2	15.1	11.1	7.0	47
Urinary Bladder	0.1	-	-	<0.1	0.1	0.5	1.2	2.6	5.3	10.2	20.9	40.3	71.0	106.1	160.4	172.4	186.0	164.7	72
Other Sites	6.6	2.2	2.7	3.3	3.8	5.8	6.6	10.1	14.7	21.4	35.6	52.8	84.9	114.7	157.4	214.6	262.1	271.8	72

¹per 100,000 ²Breast *in situ* is excluded from all sites ³Dashed out age groups had no incident cases or are found only in one sex.

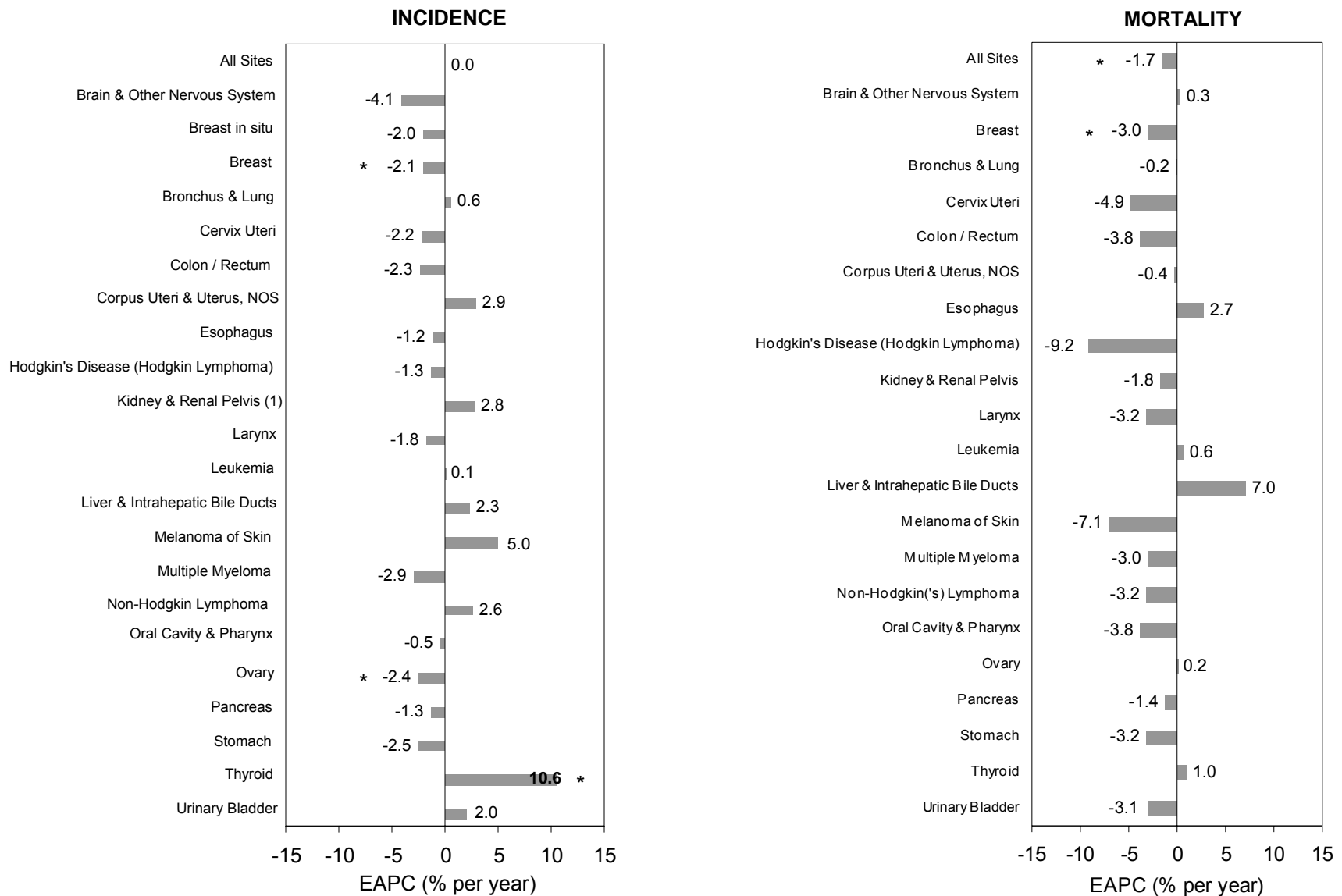
Source: Massachusetts Cancer Registry

Figure 5.
Estimated Annual Percent Change (EAPC) in Age-Adjusted Cancer Rates among Males, Massachusetts, 2000-2004



* EAPC is statistically significant ($p < 0.05$). Values appearing directly on a bar have been bolded for ease of reading only.
 Source: Massachusetts Cancer Registry

Figure 6.
Estimated Annual Percent Change (EAPC) in Age-Adjusted Cancer Rates among Females, Massachusetts, 2000-2004



*EAPC is statistically significant ($p < 0.05$). Values appearing directly on a bar have been bolded for ease of reading only.

Source: Massachusetts Cancer Registry

Table 4.
ANNUAL AGE-ADJUSTED¹ INCIDENCE RATES² FOR SELECTED CANCER SITES
Massachusetts, 2000-2004
MALES

Cancer Site/Type	2000	2001	2002	2003	2004
All Sites	613.6	620.2	622.1	589.2	580.4
Brain and Other Nervous System	9.5	8.5	8.1	8.2	9.1
Breast ³	1.4	0.8	1.7	1.7	1.2
Bronchus & Lung	87.7	87.7	88.5	83.0	82.6
Colon / Rectum	68.9	73.1	71.0	68.0	64.7
Esophagus	11.3	10.4	12.2	11.4	12.4
Hodgkin Lymphoma	3.3	3.7	3.7	3.6	3.8
Kidney & Renal Pelvis	17.4	18.6	18.9	19.4	19.8
Larynx	8.7	6.8	7.3	7.4	7.1
Leukemia	14.4	14.3	14.2	14.6	15.6
Liver & Intrahepatic Bile Ducts	8.7	9.2	9.4	8.9	9.5
Melanoma of Skin	21.2	26.9	26.9	25.1	25.7
Multiple Myeloma	6.5	7.5	7.4	6.6	7.0
Non-Hodgkin Lymphoma	22.5	24.1	23.8	23.6	23.3
Oral Cavity & Pharynx	17.5	15.5	17.0	16.9	15.8
Pancreas	12.5	12.8	13.7	13.6	12.4
Prostate	191.5	190.1	181.0	162.6	156.0
Stomach	13.7	12.3	10.7	10.8	11.9
Testis	6.2	6.0	6.9	6.2	5.7
Thyroid	4.1	4.1	5.5	6.1	6.2
Urinary Bladder	48.2	45.5	48.0	47.2	45.0

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000 males

³ Incidence rates for breast *in situ* are not presented because there are less than 20 cases.

Source: Massachusetts Cancer Registry

Table 5.
ANNUAL AGE-ADJUSTED¹ INCIDENCE RATES² FOR SELECTED CANCER SITES
Massachusetts, 2000-2004
FEMALES

Cancer Site/Type	2000	2001	2002	2003	2004
All Sites (Excluding Breast <i>in situ</i>)	452.1	456.7	462.3	451.4	455.3
Brain and Other Nervous System	6.8	6.1	6.1	6.6	5.3
Breast	144.3	139.1	135.9	130.6	133.9
Breast <i>in situ</i> ³	50.1	46.7	47.8	47.8	44.7
Bronchus & Lung	61.0	62.2	62.3	62.2	63.0
Cervix Uteri	7.1	6.5	6.8	5.2	7.1
Colon / Rectum	49.5	53.3	50.1	47.8	46.5
Corpus Uteri & Uterus, NOS	26.1	26.6	30.8	28.4	29.2
Esophagus	2.4	2.6	2.7	2.5	2.3
Hodgkin Lymphoma	3.2	2.7	2.4	3.1	2.8
Kidney & Renal Pelvis	8.6	9.6	10.4	9.9	9.7
Larynx	1.9	1.7	1.4	2.0	1.6
Leukemia	9.8	9.0	9.4	9.9	9.4
Liver & Intrahepatic Bile Ducts	2.6	2.3	2.6	2.9	2.6
Melanoma of Skin	14.6	17.6	19.7	17.4	18.7
Multiple Myeloma	4.1	4.1	4.3	4.2	3.5
Non-Hodgkin Lymphoma	15.1	17.0	18.0	16.9	17.2
Oral Cavity & Pharynx	6.5	6.8	6.5	6.7	6.4
Ovary	15.1	15.4	14.6	14.4	13.8
Pancreas	10.6	10.8	11.0	10.9	9.9
Stomach	5.5	5.3	5.2	5.4	4.8
Thyroid	13.3	13.1	15.2	18.4	18.6
Urinary Bladder	12.3	12.6	12.7	12.6	13.6

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000 females

³ Breast *in situ* is excluded from all sites

Source: Massachusetts Cancer Registry

Table 6.
ANNUAL AGE-ADJUSTED¹ INCIDENCE RATES² FOR SELECTED CANCER SITES
Massachusetts, 2000-2004
TOTAL

Cancer Site/Type	2000	2001	2002	2003	2004
All Sites (Excluding Breast <i>in situ</i>)	516.2	522.5	526.4	506.6	505.8
Brain and Other Nervous System	8.0	7.2	7.0	7.3	7.1
Breast	79.8	76.4	75.1	71.8	73.2
Breast <i>in situ</i> ³	26.9	25.1	25.6	25.5	23.8
Bronchus & Lung	71.6	72.5	72.8	70.7	70.9
Cervix Uteri	- ⁴	-	-	-	-
Colon / Rectum	57.7	61.7	59.3	56.4	54.7
Corpus Uteri & Uterus, NOS	-	-	-	-	-
Esophagus	6.2	6.0	6.8	6.4	6.7
Hodgkin Lymphoma	3.3	3.2	3.0	3.3	3.2
Kidney & Renal Pelvis	12.3	13.7	14.2	14.1	14.2
Larynx	4.9	3.9	4.0	4.4	4.0
Leukemia	11.8	11.2	11.5	11.9	12.1
Liver & Intrahepatic Bile Ducts	5.3	5.4	5.6	5.6	5.7
Melanoma of Skin	17.3	21.2	22.4	20.6	21.6
Multiple Myeloma	5.0	5.5	5.6	5.2	5.1
Non-Hodgkin Lymphoma	18.2	20.1	20.5	19.7	19.9
Oral Cavity & Pharynx	11.4	10.6	11.3	11.4	10.7
Ovary	-	-	-	-	-
Pancreas	11.6	11.7	12.2	12.0	11.0
Prostate	-	-	-	-	-
Stomach	8.9	8.3	7.6	7.7	7.8
Testis	-	-	-	-	-
Thyroid	8.8	8.8	10.5	12.4	12.6
Urinary Bladder	27.0	26.1	27.2	26.9	26.8

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000 total population

³ Breast *in situ* is excluded from all sites

⁴ Dashed out cancers found in only one sex

Source: Massachusetts Cancer Registry

Table 7.
ANNUAL AGE-ADJUSTED¹ MORTALITY RATES² FOR SELECTED CANCER SITES
Massachusetts, 2000-2004
MALES

Cancer Site / Type	2000	2001	2002	2003	2004
All Sites	257.2	245.4	244.7	235.0	227.0
Brain & Other Nervous System	5.9	5.2	5.5	4.9	4.7
Breast	0.2	0.3	0.3	0.2	0.6
Bronchus & Lung	73.2	68.5	69.6	66.8	64.9
Colon / Rectum	28.4	25.9	25.1	22.9	20.9
Esophagus	9.7	9.0	9.9	11.0	9.1
Hodgkin Lymphoma	0.2	0.7	0.9	0.6	0.4
Kidney & Renal Pelvis	6.6	5.8	5.3	5.9	6.2
Larynx	2.7	2.9	2.8	2.3	2.6
Leukemia	10.0	9.6	8.1	9.5	8.9
Liver & Intrahepatic Bile Ducts	6.6	8.1	7.5	7.2	7.2
Melanoma of Skin	4.7	4.3	4.0	4.6	4.2
Multiple Myeloma	4.1	4.5	4.9	4.3	4.2
Non-Hodgkin Lymphoma	8.8	9.4	10.0	9.4	8.8
Oral Cavity & Pharynx	4.0	4.0	4.6	3.7	4.3
Pancreas	12.8	12.1	13.5	14.0	12.6
Prostate	30.7	29.4	27.5	26.1	23.4
Stomach	8.8	7.0	6.5	5.8	5.8
Testis	0.3	0.1	0.4	0.2	0.3
Thyroid	0.4	0.7	0.3	0.3	0.7
Urinary Bladder	8.0	9.9	7.9	8.7	9.3

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000 males

Source: Massachusetts Cancer Registry

Table 8.
ANNUAL AGE-ADJUSTED¹ MORTALITY RATES² FOR SELECTED CANCER SITES
Massachusetts, 2000-2004
FEMALES

Cancer Site/Type	2000	2001	2002	2003	2004
All Sites	174.5	171.4	171.9	165.8	163.2
Brain & Other Nervous System	3.7	3.0	3.3	3.8	3.3
Breast	26.8	26.5	26.3	24.3	24.0
Bronchus & Lung	44.2	45.1	45.1	45.7	43.4
Cervix Uteri	1.9	1.6	1.5	1.3	1.7
Colon / Rectum	17.8	17.4	18.7	15.9	15.3
Corpus Uteri & Uterus, NOS	4.4	4.2	4.6	4.4	4.2
Esophagus	2.0	1.8	1.8	2.1	2.1
Hodgkin Lymphoma	0.4	0.6	0.3	0.3	0.3
Kidney & Renal Pelvis	2.4	2.7	2.3	2.2	2.4
Larynx	0.6	0.5	0.7	0.5	0.5
Leukemia	5.7	5.5	5.3	5.7	5.8
Liver & Intrahepatic Bile Ducts	2.0	2.8	2.4	2.6	3.0
Melanoma of Skin	2.5	1.9	1.7	2.1	1.7
Multiple Myeloma	2.9	3.1	3.5	3.2	2.5
Non-Hodgkin Lymphoma	6.6	7.0	6.8	6.0	6.0
Oral Cavity & Pharynx	1.9	1.7	1.4	1.6	1.6
Ovary	9.0	9.0	9.7	8.8	9.2
Pancreas	10.6	10.0	10.1	9.7	10.1
Stomach	3.3	3.5	3.8	3.0	3.0
Thyroid	0.5	0.4	0.4	0.7	0.4
Urinary Bladder	2.8	2.7	3.3	2.6	2.4

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000 females

Source: Massachusetts Cancer Registry

Table 9.
ANNUAL AGE-ADJUSTED¹ MORTALITY RATES² FOR SELECTED CANCER SITES
Massachusetts, 2000-2004
TOTAL

Cancer Site/Type	2000	2001	2002	2003	2004
All Sites	205.8	199.5	199.8	192.6	187.9
Brain & Other Nervous System	4.7	4.0	4.3	4.3	4.0
Breast	15.6	15.3	15.2	14.0	13.9
Bronchus & Lung	55.9	54.3	55.0	54.4	52.0
Cervix Uteri	- ³	-	-	-	-
Colon / Rectum	22.0	20.9	21.4	18.7	17.7
Corpus Uteri & Uterus, NOS	-	-	-	-	-
Esophagus	5.3	4.8	5.3	5.9	5.1
Hodgkin Lymphoma	0.3	0.6	0.6	0.5	0.4
Kidney & Renal Pelvis	4.1	4.0	3.6	3.7	4.0
Larynx	1.5	1.5	1.5	1.3	1.4
Leukemia	7.4	7.1	6.4	7.2	7.1
Liver & Intrahepatic Bile Ducts	4.1	5.1	4.6	4.6	4.9
Melanoma of Skin	3.4	2.9	2.7	3.1	2.7
Multiple Myeloma	3.3	3.6	4.0	3.7	3.2
Non-Hodgkin Lymphoma	7.4	8.1	8.0	7.3	7.2
Oral Cavity & Pharynx	2.8	2.6	2.8	2.5	2.8
Ovary	-	-	-	-	-
Pancreas	11.7	11.0	11.5	11.5	11.2
Prostate	-	-	-	-	-
Stomach	5.4	4.9	5.0	4.2	4.1
Testis	-	-	-	-	-
Thyroid	0.5	0.5	0.4	0.5	0.5
Urinary Bladder	4.7	5.5	5.1	4.9	5.1

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000 total population

³ Dashed out cancers found in only one sex

Source: Massachusetts Cancer Registry

Table 10.
FIVE LEADING CANCER INCIDENCE RATES BY RACE/ETHNICITY AND SEX
Massachusetts, 2000-2004

MALES

AGE-ADJUSTED¹ INCIDENCE RATE²				
RANK	White, non-Hispanic	Black, non-Hispanic	Asian, non-Hispanic	Hispanic
1	Prostate 170.6	Prostate 271.8	Prostate 77.9	Prostate 183.7
2	Bronchus & Lung 87.0	Bronchus & Lung 88.5	Bronchus & Lung 49.7	Bronchus & Lung 49.3
3	Colon / Rectum 69.7	Colon / Rectum 53.7	Colon / Rectum 47.0	Colon / Rectum 48.6
4	Urinary Bladder 48.6	Urinary Bladder 22.0	Liver & Intrahepatic Bile Ducts 28.6	Urinary Bladder 27.8
5	Melanoma 26.1	Stomach 19.5	Stomach 15.8	Stomach 21.3

FEMALES

AGE-ADJUSTED¹ INCIDENCE RATE²				
RANK	White, non-Hispanic	Black, non-Hispanic	Asian, non-Hispanic	Hispanic
1	Breast ³ 140.2	Breast ³ 103.2	Breast ³ 68.8	Breast ³ 93.3
2	Bronchus & Lung 64.1	Bronchus & Lung 48.4	Colon / Rectum 33.8	Colon / Rectum 36.3
3	Colon / Rectum 49.5	Colon / Rectum 45.7	Bronchus & Lung 30.3	Bronchus & Lung 27.1
4	Corpus Uteri & Uterus, NOS 28.7	Corpus Uteri & Uterus, NOS 19.9	Thyroid 19.4	Corpus Uteri & Uterus, NOS 23.6
5	Melanoma 18.5	Non-Hodgkin Lymphoma 12.4	Corpus Uteri & Uterus, NOS 16.0	Non-Hodgkin Lymphoma 17.6

¹ Age-adjusted to the 2000 U.S. Standard Population ² per 100,000. ³ Breast cancer rates do not include breast *in situ* cases.
Source: Massachusetts Cancer Registry

Table 11.
INCIDENCE CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 2000-2004
MALES

	All Races ²		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
Cancer Site/Type	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases
All Sites	88132	100	79913	100	3377	100	1196	100	2149	100
Brain & Other Nervous System	1307	1.5	1195	1.5	30	0.9	26	2.2	43	2.0
Breast ³	200	0.2	181	0.2	10	0.3	3	0.3	3	0.1
Bronchus & Lung	12338	14.0	11481	14.4	449	13.3	164	13.7	178	8.3
Colon / Rectum	9927	11.3	9177	11.5	279	8.3	166	13.9	199	9.3
Esophagus	1689	1.9	1560	2.0	57	1.7	15	1.3	43	2.0
Hodgkin Lymphoma	563	0.6	511	0.6	16	0.5	5	0.4	22	1.0
Kidney & Renal Pelvis	2799	3.2	2550	3.2	103	3.1	26	2.2	74	3.4
Larynx	1098	1.2	996	1.2	42	1.2	8	0.7	33	1.5
Leukemia	2132	2.4	1941	2.4	58	1.7	27	2.3	67	3.1
Liver & Intrahepatic Bile Ducts	1362	1.5	1050	1.3	82	2.4	126	10.5	86	4.0
Melanoma of Skin	3744	4.2	3472	4.3	4	0.1	5	0.4	21	1.0
Multiple Myeloma	1003	1.1	893	1.1	67	2.0	6	0.5	26	1.2
Non-Hodgkin Lymphoma	3449	3.9	3086	3.9	131	3.9	61	5.1	119	5.5
Oral Cavity & Pharynx	2504	2.8	2232	2.8	96	2.8	61	5.1	87	4.0
Pancreas	1877	2.1	1717	2.1	82	2.4	23	1.9	42	2.0
Prostate	25774	29.2	22814	28.5	1412	41.8	255	21.3	675	31.4
Stomach	1693	1.9	1448	1.8	90	2.7	53	4.4	86	4.0
Testis	994	1.1	913	1.1	11	0.3	14	1.2	40	1.9
Thyroid	809	0.9	721	0.9	19	0.6	30	2.5	23	1.1
Urinary Bladder	6636	7.5	6354	8.0	103	3.1	34	2.8	92	4.3
Other Sites	6234	7.1	5621	7.0	236	7.0	88	7.4	190	8.8

¹ Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category.

² The number of cases for all races is not the sum of cases by race/ethnicity. ³ Incidence rates for breast *in situ* are not presented.

Source: Massachusetts Cancer Registry

Table 12.
INCIDENCE CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 2000-2004
FEMALES

	All Races ²		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
Cancer Site/Type	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases
All Sites	86578	100	79192	100	2721	100	1268	100	2109	100
Brain & Other Nervous System	1113	1.3	1018	1.3	23	0.8	10	0.8	49	2.3
Breast ³	25293	29.2	23200	29.3	817	30.0	350	27.6	603	28.6
Bronchus & Lung	11898	13.7	11215	14.2	345	12.7	116	9.1	134	6.4
Cervix Uteri	1155	1.3	920	1.2	78	2.9	35	2.8	95	4.5
Colon / Rectum	10059	11.6	9300	11.7	322	11.8	140	11.0	193	9.2
Corpus Uteri & Uterus, NOS	5219	6.0	4757	6.0	148	5.4	77	6.1	152	7.2
Esophagus	494	0.6	445	0.6	29	1.1	3	0.2	14	0.7
Hodgkin Lymphoma	483	0.6	426	0.5	21	0.8	9	0.7	25	1.2
Kidney & Renal Pelvis	1825	2.1	1689	2.1	65	2.4	16	1.3	34	1.6
Larynx	316	0.4	286	0.4	15	0.6	0	0.0	10	0.5
Leukemia	1813	2.1	1644	2.1	60	2.2	23	1.8	66	3.1
Liver & Intrahepatic Bile Ducts	511	0.6	418	0.5	31	1.1	27	2.1	33	1.6
Melanoma of Skin	3212	3.7	2933	3.7	9	0.3	9	0.7	27	1.3
Multiple Myeloma	801	0.9	713	0.9	52	1.9	6	0.5	23	1.1
Non-Hodgkin Lymphoma	3268	3.8	2965	3.7	96	3.5	56	4.5	103	4.9
Oral Cavity & Pharynx	1244	1.4	1091	1.4	49	1.8	45	3.5	32	1.5
Ovary	2744	3.2	2563	3.2	45	1.7	47	3.7	48	2.3
Pancreas	2149	2.5	1984	2.5	68	2.5	29	2.3	43	2.0
Stomach	1086	1.3	914	1.2	58	2.1	44	3.5	57	2.7
Thyroid	2726	3.1	2306	2.9	95	3.5	122	9.6	123	5.8
Urinary Bladder	2536	2.9	2427	3.1	36	1.3	14	1.1	35	1.7
Other Sites	6633	7.7	5979	7.6	259	9.5	90	7.1	210	10.0

¹ Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category.

² The number of cases for all races is not the sum of cases by race/ethnicity. ³ Breast *in situ* cases are excluded from all sites and from breast cancer type.

Source: Massachusetts Cancer Registry

Table 13.
INCIDENCE CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 2000-2004
TOTAL²

Cancer Site/Type	All Races ³		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases
All Sites	174719	100	159112	100	6098	100	2465	100	4258	100
Brain & Other Nervous System	2420	1.4	2213	1.4	53	0.9	36	1.5	92	2.2
Breast ⁴	25494	14.6	23382	14.7	827	13.6	353	14.3	606	14.2
Bronchus & Lung	24237	13.9	22697	14.3	794	13.0	280	11.4	312	7.3
Cervix Uteri	1155	0.7	920	0.6	78	1.3	35	1.4	95	2.2
Colon / Rectum	19988	11.4	18479	11.6	601	9.9	306	12.4	392	9.2
Corpus Uteri & Uterus, NOS	5219	3.0	4757	3.0	148	2.4	77	3.1	152	3.6
Esophagus	2183	1.2	2005	1.3	86	1.4	18	0.7	57	1.3
Hodgkin Lymphoma	1046	0.6	937	0.6	37	0.6	14	0.6	47	1.1
Kidney & Renal Pelvis	4624	2.6	4239	2.7	168	2.8	42	1.7	108	2.5
Larynx	1414	0.8	1282	0.8	57	0.9	8	0.3	43	1.0
Leukemia	3945	2.3	3585	2.3	118	1.9	50	2.0	133	3.1
Liver & Intrahepatic Bile Ducts	1873	1.1	1468	0.9	113	1.9	153	6.2	119	2.8
Melanoma of Skin	6956	4.0	6405	4.0	13	0.2	14	0.6	48	1.1
Multiple Myeloma	1804	1.0	1606	1.0	119	2.0	12	0.5	49	1.2
Non-Hodgkin Lymphoma	6719	3.8	6052	3.8	227	3.7	118	4.8	222	5.2
Oral Cavity & Pharynx	3748	2.1	3323	2.1	145	2.4	106	4.3	119	2.8
Ovary	2744	1.6	2563	1.6	45	0.7	47	1.9	48	1.1
Pancreas	4026	2.3	3701	2.3	150	2.5	52	2.1	85	2.0
Prostate	25774	14.8	22814	14.3	1412	23.2	255	10.3	675	15.9
Stomach	2779	1.6	2362	1.5	148	2.4	97	3.9	143	3.4
Testis	994	0.6	913	0.6	11	0.2	14	0.6	40	0.9
Thyroid	3536	2.0	3027	1.9	114	1.9	152	6.2	146	3.4
Urinary Bladder	9173	5.3	8781	5.5	139	2.3	48	1.9	127	3.0
Other Sites	12868	7.4	11601	7.3	495	8.1	178	7.2	400	9.4

¹ Cases are only included in one race/ethnicity category. ² Total includes persons classified as transsexual and persons of unknown sex. ³ The number of cases for all races is not the sum of cases by race/ethnicity. ⁴ Breast *in situ* cases are excluded from all sites and from breast cancer type. Source: Massachusetts Cancer Registry

Table 14.
AGE-ADJUSTED¹ INCIDENCE RATES² AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY
RACE/ETHNICITY³
Massachusetts, 2000-2004
MALES

	All Races		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
Cancer Site/Type	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL
All Sites	604.8	600.8-608.8	603.7	599.5-607.9	635.9	613.1-658.6	325.8	305.6-346	506.7	481.9-531.5
Brain & Other Nervous System	8.7	8.2-9.2	9.1	8.6-9.6	3.8	2.3-5.4	5.5	3.2-7.9	6.1	3.9-8.4
Breast ⁴	1.4	1.2-1.6	1.4	1.2-1.6	*	*	*	*	*	*
Bronchus & Lung	85.8	84.3-87.3	87.0	85.4-88.6	88.5	79.9-97.2	49.7	41.5-57.9	49.3	41.3-57.3
Colon / Rectum	69.0	67.7-70.4	69.7	68.3-71.1	53.7	47.0-60.5	47.0	39.2-54.7	48.6	40.8-56.4
Esophagus	11.6	11.0-12.1	11.7	11.1-12.3	10.6	7.7-13.5	5.1	2.3-7.8	11.1	7.3-15.0
Hodgkin Lymphoma	3.6	3.3-3.9	4.0	3.6-4.3	*	*	*	*	2.0	1.1-3.0
Kidney & Renal Pelvis	18.8	18.1-19.5	19.0	18.3-19.7	17.5	13.9-21.1	6.4	3.9-9.0	16.7	12.3-21.1
Larynx	7.5	7.0-7.9	7.4	7-7.9	8.4	5.7-11.2	*	*	7.9	4.8-11.1
Leukemia	14.6	14-15.3	15.0	14.3-15.6	9.7	6.9-12.5	6.1	3.5-8.8	11.5	7.9-15.1
Liver & Intrahepatic Bile Ducts	9.1	8.6-9.6	7.8	7.4-8.3	13.9	10.7-17.1	28.6	23.3-33.9	16.2	12.3-20.2
Melanoma of Skin	25.2	24.4-26	26.1	25.2-27	*	*	*	*	4.0	1.9-6.1
Multiple Myeloma	7.0	6.5-7.4	6.8	6.3-7.2	12.7	9.5-15.9	*	*	7.0	4.0-10.1
Non-Hodgkin Lymphoma	23.5	22.7-24.3	23.4	22.6-24.2	19.9	16.2-23.6	15.0	10.8-19.3	20.1	15.8-24.5
Oral Cavity & Pharynx	16.5	15.9-17.2	16.4	15.7-17	16.1	12.7-19.6	14.2	10.2-18.2	18.2	13.8-22.7
Pancreas	13.0	12.4-13.6	13.0	12.4-13.6	16.1	12.4-19.8	6.3	3.5-9.1	9.6	6.3-13
Prostate	176.1	173.9-178.2	170.6	168.4-172.9	271.8	256.9-286.6	77.9	67.8-88	183.7	168.6-198.8
Stomach	11.9	11.3-12.4	11.1	10.5-11.7	19.5	15.2-23.8	15.8	11.1-20.4	21.3	16-26.5
Testis	6.2	5.8-6.6	7.1	6.6-7.5	*	*	*	*	2.9	1.9-3.8
Thyroid	5.2	4.8-5.5	5.3	4.9-5.7	*	*	6.1	3.6-8.5	3.3	1.6-4.9
Urinary Bladder	46.8	45.6-47.9	48.6	47.4-49.8	22.0	17.5-26.4	9.7	6.2-13.2	27.8	21.5-34.2

¹ age-adjusted to the 2000 U.S. Standard Population ² per 100,000

⁴ Incidence rates for breast *in situ* are not presented because there are less than 20 cases.

* age-adjusted incidence rate not calculated when the numbers of cases are less than 20.

Source: Massachusetts Cancer Registry

Table 15.
AGE-ADJUSTED¹ INCIDENCE RATES² AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY
RACE/ETHNICITY³
Massachusetts, 2000-2004
FEMALES

	All Races		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
Cancer Site/Type	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL
All Sites (Excluding Breast <i>in situ</i>)	455.4	452.4-458.5	462.5	459.2-465.7	358.9	345.2-372.7	270.1	254.3-286	345.5	329.1-362
Brain & Other Nervous System	6.2	5.8-6.6	6.5	6.1-6.9	2.4	1.4-3.4	*	*	5.1	3.5-6.7
Breast	136.7	135-138.4	140.2	138.4-142	103.2	96-110.4	68.8	61.2-76.4	93.3	85.1-101.5
Breast <i>in situ</i>⁴	47.5	46.5-48.5	48.7	47.6-49.8	30.0	26.1-33.9	27.9	23.3-32.5	31.3	27.0-35.6
Bronchus & Lung	62.1	61.0-63.2	64.1	62.9-65.3	48.4	43.2-53.6	30.3	24.6-36.0	27.1	22.2-32.1
Cervix Uteri	6.5	6.1-6.9	6.0	5.6-6.4	9.2	7.1-11.3	7.0	4.5-9.4	12.8	9.9-15.8
Colon / Rectum	49.4	48.4-50.4	49.5	48.5-50.6	45.7	40.6-50.7	33.8	28-39.7	36.3	30.7-41.9
Corpus Uteri & Uterus, NOS	28.3	27.5-29	28.7	27.9-29.5	19.9	16.6-23.1	16.0	12.3-19.8	23.6	19.5-27.7
Esophagus	2.5	2.3-2.7	2.4	2.2-2.7	4.0	2.5-5.4	*	*	*	*
Hodgkin Lymphoma	2.9	2.6-3.1	3.1	2.8-3.4	2.1	1.2-3.1	*	*	2.4	1.3-3.6
Kidney & Renal Pelvis	9.7	9.2-10.1	9.9	9.4-10.4	8.1	6.1-10.1	*	*	5.8	3.7-7.9
Larynx	1.7	1.5-1.9	1.7	1.5-1.9	*	*	*	*	*	*
Leukemia	9.5	9-9.9	9.6	9.1-10.1	7.5	5.5-9.4	4.3	2.4-6.2	9.3	6.7-11.9
Liver & Intrahepatic Bile Ducts	2.6	2.3-2.8	2.3	2.1-2.5	4.4	2.8-5.9	7.2	4.4-10.0	7.3	4.6-9.9
Melanoma of Skin	17.6	17.0-18.2	18.5	17.8-19.1	*	*	*	*	3.3	1.9-4.8
Multiple Myeloma	4.0	3.8-4.3	3.9	3.6-4.2	7.6	5.5-9.6	*	*	5.0	2.9-7.2
Non-Hodgkin Lymphoma	16.9	16.3-17.5	16.8	16.2-17.5	12.4	9.9-15.0	12.0	8.6-15.4	17.6	13.7-21.4
Oral Cavity & Pharynx	6.6	6.2-6.9	6.4	6.0-6.8	6.3	4.5-8.1	8.6	5.9-11.2	5.7	3.6-7.9
Ovary	14.7	14.1-15.2	15.3	14.7-15.9	5.9	4.2-7.7	8.3	5.7-10.8	8.4	5.8-11
Pancreas	10.6	10.2-11.1	10.7	10.2-11.1	9.9	7.5-12.3	7.9	5.0-10.9	8.7	5.9-11.6
Stomach	5.2	4.9-5.5	4.7	4.3-5.0	8.2	6.0-10.3	10.9	7.5-14.3	10.8	7.8-13.9
Thyroid	15.8	15.2-16.4	15.8	15.2-16.5	10.6	8.4-12.7	19.4	15.7-23.1	14.3	11.4-17.1
Urinary Bladder	12.8	12.3-13.3	13.3	12.8-13.9	5.3	3.5-7.0	4.0	1.9-6.1	7.5	4.8-10.1

¹ age-adjusted to the 2000 U.S. Standard Population ² per 100,000

³ Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category.

⁴ Breast *in situ* is excluded from 'All Sites'

* Age-adjusted incidence rate not calculated when there are less than 20 cases. Source: Massachusetts Cancer Registry

Table 16.
AGE-ADJUSTED¹ INCIDENCE RATES² AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY
RACE/ETHNICITY³
Massachusetts, 2000-2004
TOTAL

	All Races		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
Cancer Site/Type	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL
All Sites (Excluding Breast <i>in situ</i>)	515.4	513-517.8	518.7	516.1-521.2	470.0	457.8-482.2	293.9	281.4-306.4	411.4	397.4-425.4
Brain & Other Nervous System	7.3	7.0-7.6	7.7	7.4-8.0	3.0	2.2-3.9	3.6	2.3-4.8	5.5	4.2-6.8
Breast	75.2	74.3-76.1	76.9	75.9-77.9	58.8	54.7-62.9	36.5	32.4-40.5	52.6	47.9-57.4
Breast <i>in situ</i> ⁴	25.4	24.9-25.9	26.0	25.4-26.6	17.0	14.7-19.2	14.5	12.1-16.9	17.2	14.8-19.6
Bronchus & Lung	71.7	70.8-72.6	73.3	72.3-74.3	64.5	59.9-69.1	39.1	34.3-43.9	36.3	31.9-40.7
Cervix Uteri	- ⁵	-	-	-	-	-	-	-	-	-
Colon / Rectum	57.9	57.1-58.7	58.3	57.4-59.1	49.3	45.2-53.3	39.9	35.1-44.7	41.6	37.0-46.2
Corpus Uteri & Uterus, NOS	-	-	-	-	-	-	-	-	-	-
Esophagus	6.4	6.2-6.7	6.5	6.2-6.8	6.7	5.3-8.2	*	*	6.5	4.6-8.4
Hodgkin Lymphoma	3.2	3.0-3.4	3.5	3.3-3.7	2.1	1.4-2.8	*	*	2.3	1.5-3.1
Kidney & Renal Pelvis	13.7	13.3-14.1	13.9	13.5-14.4	12.0	10.1-13.9	5.0	3.4-6.6	10.4	8.2-12.6
Larynx	4.2	4.0-4.4	4.2	4.0-4.4	4.5	3.3-5.8	*	*	4.0	2.7-5.4
Leukemia	11.7	11.3-12.1	11.9	11.5-12.3	8.3	6.7-9.9	5.1	3.6-6.7	10.2	8.1-12.4
Liver & Intrahepatic Bile Ducts	5.5	5.3-5.8	4.8	4.5-5.0	8.6	6.9-10.2	17.5	14.6-20.5	11.4	9.1-13.7
Melanoma of Skin	20.6	20.1-21.1	21.5	21.0-22.0	*	*	*	*	3.5	2.4-4.7
Multiple Myeloma	5.3	5.0-5.5	5.1	4.9-5.4	9.8	8.0-11.6	*	*	5.9	4.1-7.6
Non-Hodgkin Lymphoma	19.7	19.2-20.2	19.6	19.1-20.1	15.8	13.7-18	13.4	10.7-16	19.0	16.1-21.9
Oral Cavity & Pharynx	11.1	10.7-11.4	10.9	10.5-11.3	10.5	8.7-12.2	11.1	8.8-13.3	11.2	9.0-13.4
Ovary	-	-	-	-	-	-	-	-	-	-
Pancreas	11.7	11.3-12.1	11.7	11.3-12.1	12.5	10.4-14.5	7.3	5.2-9.4	9.3	7.0-11.5
Prostate	-	-	-	-	-	-	-	-	-	-
Stomach	8.0	7.7-8.3	7.4	7.1-7.7	12.5	10.4-14.6	13.1	10.3-15.9	15.2	12.4-18
Testis	-	-	-	-	-	-	-	-	-	-
Thyroid	10.6	10.3-11.0	10.7	10.3-11.1	7.0	5.7-8.4	12.9	10.7-15.1	9.2	7.4-10.9
Urinary Bladder	26.8	26.2-27.3	27.9	27.3-28.5	11.9	9.9-13.9	6.7	4.7-8.7	15.7	12.8-18.7

¹ age-adjusted to the 2000 U.S. Standard Population. ² per 100,000 ³ Cases are only included in one race/ethnicity category. ⁴ Breast *in situ* is excluded from all sites. ⁵ Dashed out cancers are found in only one sex. * Age-adjusted incidence rate not calculated when there are less than 20 cases. Source: Massachusetts Cancer Registry

Table 17.
FIVE LEADING CANCER MORTALITY RATES BY RACE/ETHNICITY AND SEX

Massachusetts, 2000-2004

MALES

AGE-ADJUSTED¹ MORTALITY RATE²				
RANK	White, non-Hispanic	Black, non-Hispanic	Asian, non-Hispanic	Hispanic
1	Bronchus & Lung 69.7	Bronchus & Lung 80.0	Bronchus & Lung 39.7	Bronchus & Lung 31.6
2	Prostate 27.1	Prostate 56.9	Liver & Intrahepatic Bile Ducts 16.1	Prostate 15.7
3	Colon / Rectum 25.1	Colon / Rectum 27.0	Colon / Rectum 9.2	Colon / Rectum 12.4
4	Pancreas 13.1	Pancreas 16.8	*	Pancreas 9.4
5	Esophagus 10.0	Stomach 15.0	*	Liver & Intrahepatic Bile Ducts 9.2

FEMALES

AGE-ADJUSTED¹ MORTALITY RATE²				
RANK	White, non-Hispanic	Black, non-Hispanic	Asian, non-Hispanic	Hispanic
1	Bronchus & Lung 46.5	Bronchus & Lung 36.2	Bronchus & Lung 19.4	Breast 12.6
2	Breast 26.2	Breast 28.4	Colon / Rectum 9.6	Bronchus & Lung 12.1
3	Colon / Rectum 17.2	Colon / Rectum 18.9	Breast 8.5	Colon / Rectum 8.6
4	Pancreas 10.2	Pancreas 11.1	Stomach 6.5	Pancreas 7.8
5	Ovary 9.6	Corpus Uteri & Uterus, NOS 7.6	Pancreas 6.4	Liver & Intrahepatic Bile Ducts 4.5

¹ Age-adjusted to the 2000 U.S. Standard Population ² per 100,000

* No other reported cancer with greater than 20 cases for the ranking

Source: Massachusetts Cancer Registry

Table 18.
MORTALITY CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 2000-2004
MALES

Cancer Site/Type	All Races ²		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases
All Sites	33943	100.0	31602	100.0	1409	100.0	397	100.0	506	100.0
Brain & Other Nervous System	783	2.3	733	2.3	21	1.5	14	3.5	14	2.8
Breast	45	0.1	41	0.1	3	0.2	1	0.3	0	0.0
Bronchus & Lung	9738	28.7	9116	28.8	383	27.2	118	29.7	116	22.9
Colon / Rectum	3432	10.1	3231	10.2	125	8.9	31	7.8	42	8.3
Esophagus	1402	4.1	1314	4.2	51	3.6	10	2.5	25	4.9
Hodgkin Lymphoma	84	0.2	71	0.2	8	0.6	0	0.0	5	1.0
Kidney & Renal Pelvis	850	2.5	812	2.6	21	1.5	8	2.0	8	1.6
Larynx	376	1.1	349	1.1	19	1.3	0	0.0	7	1.4
Leukemia	1292	3.8	1206	3.8	43	3.1	18	4.5	23	4.5
Liver & Intrahepatic Bile Ducts	1066	3.1	879	2.8	69	4.9	69	17.4	47	9.3
Melanoma of Skin	628	1.9	616	1.9	3	0.2	2	0.5	7	1.4
Multiple Myeloma	616	1.8	570	1.8	38	2.7	0	0.0	8	1.6
Non-Hodgkin Lymphoma	1300	3.8	1234	3.9	39	2.8	12	3.0	14	2.8
Oral Cavity & Pharynx	597	1.8	536	1.7	25	1.8	18	4.5	18	3.6
Pancreas	1853	5.5	1714	5.4	84	6.0	18	4.5	33	6.5
Prostate	3595	10.6	3330	10.5	208	14.8	14	3.5	40	7.9
Stomach	943	2.8	828	2.6	71	5.0	14	3.5	30	5.9
Testis	43	0.1	40	0.1	1	0.1	1	0.3	1	0.2
Thyroid	64	0.2	57	0.2	7	0.5	0	0.0	0	0.0
Urinary Bladder	1194	3.5	1152	3.6	31	2.2	6	1.5	4	0.8
Other Sites	4042	11.9	3773	11.9	159	11.3	43	10.8	64	12.6

¹ Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category.

² The number of cases for all races is not the sum of cases by race/ethnicity.

Source: Massachusetts Cancer Registry

Table 19.
MORTALITY CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 2000-2004
FEMALES

Cancer Site / Type	All Races ²		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases
All Sites	34542	100.0	32448	100.0	1245	100.0	349	100.0	464	100.0
Brain & Other Nervous System	646	1.9	615	1.9	15	1.2	7	2.0	9	1.9
Breast	5123	14.8	4792	14.8	215	17.3	36	10.3	74	15.9
Bronchus & Lung	8824	25.5	8440	26.0	251	20.2	71	20.3	54	11.6
Cervix Uteri	300	0.9	253	0.8	22	1.8	10	2.9	15	3.2
Colon / Rectum	3693	10.7	3488	10.7	129	10.4	34	9.7	40	8.6
Corpus Uteri & Uterus, NOS	879	2.5	799	2.5	53	4.3	7	2.0	17	3.7
Esophagus	401	1.2	372	1.1	21	1.7	2	0.6	6	1.3
Hodgkin Lymphoma	75	0.2	74	0.2	1	0.1	0	0.0	0	0.0
Kidney & Renal Pelvis	498	1.4	473	1.5	15	1.2	5	1.4	3	0.6
Larynx	112	0.3	102	0.3	9	0.7	0	0.0	1	0.2
Leukemia	1163	3.4	1084	3.3	38	3.1	16	4.6	24	5.2
Liver & Intrahepatic Bile Ducts	536	1.6	469	1.4	26	2.1	20	5.7	20	4.3
Melanoma of Skin	383	1.1	381	1.2	1	0.1	0	0.0	0	0.0
Multiple Myeloma	630	1.8	579	1.8	37	3.0	0	0.0	13	2.8
Non-Hodgkin Lymphoma	1376	4.0	1288	4.0	48	3.9	19	5.4	20	4.3
Oral Cavity & Pharynx	329	1.0	307	0.9	9	0.7	8	2.3	3	0.6
Ovary	1802	5.2	1723	5.3	37	3.0	17	4.9	25	5.4
Pancreas	2094	6.1	1957	6.0	75	6.0	23	6.6	35	7.5
Stomach	720	2.1	633	2.0	40	3.2	26	7.4	21	4.5
Thyroid	98	0.3	89	0.3	4	0.3	4	1.1	1	0.2
Urinary Bladder	609	1.8	584	1.8	15	1.2	2	0.6	7	1.5
Other Sites	4251	12.3	3946	12.2	184	14.8	42	12.0	76	16.4

¹ Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category. ² The number of cases for all races is not the sum of cases by race/ethnicity.

Source: Massachusetts Cancer Registry

Table 20.
MORTALITY CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 2000-2004
TOTAL

Cancer Site/Type	All Races ²		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases
All Sites	68485	100.0	64050	100.0	2654	100.0	746	100.0	970	100.0
Brain & Other Nervous System	1429	2.1	1348	2.1	36	1.4	21	2.8	23	2.4
Breast	5168	7.5	4833	7.5	218	8.2	37	5.0	74	7.6
Bronchus & Lung	18562	27.1	17556	27.4	634	23.9	189	25.3	170	17.5
Cervix Uteri	300	0.4	253	0.4	22	0.8	10	1.3	15	1.5
Colon / Rectum	7125	10.4	6719	10.5	254	9.6	65	8.7	82	8.5
Corpus Uteri & Uterus, NOS	879	1.3	799	1.2	53	2.0	7	0.9	17	1.8
Esophagus	1803	2.6	1686	2.6	72	2.7	12	1.6	31	3.2
Hodgkin Lymphoma	159	0.2	145	0.2	9	0.3	0	0.0	5	0.5
Kidney & Renal Pelvis	1348	2.0	1285	2.0	36	1.4	13	1.7	11	1.1
Larynx	488	0.7	451	0.7	28	1.1	0	0.0	8	0.8
Leukemia	2455	3.6	2290	3.6	81	3.1	34	4.6	47	4.8
Liver & Intrahepatic Bile Ducts	1602	2.3	1348	2.1	95	3.6	89	11.9	67	6.9
Melanoma of Skin	1011	1.5	997	1.6	4	0.2	2	0.3	7	0.7
Multiple Myeloma	1246	1.8	1149	1.8	75	2.8	0	0.0	21	2.2
Non-Hodgkin Lymphoma	2676	3.9	2522	3.9	87	3.3	31	4.2	34	3.5
Oral Cavity & Pharynx	926	1.4	843	1.3	34	1.3	26	3.5	21	2.2
Ovary	1802	2.6	1723	2.7	37	1.4	17	2.3	25	2.6
Pancreas	3947	5.8	3671	5.7	159	6.0	41	5.5	68	7.0
Prostate	3595	5.2	3330	5.2	208	7.8	14	1.9	40	4.1
Stomach	1663	2.4	1461	2.3	111	4.2	40	5.4	51	5.3
Testis	43	0.1	40	0.1	1	0.0	1	0.1	1	0.1
Thyroid	162	0.2	146	0.2	11	0.4	4	0.5	1	0.1
Urinary Bladder	1803	2.6	1736	2.7	46	1.7	8	1.1	11	1.1
Other Sites	8293	12.1	7719	12.1	343	12.9	85	11.4	140	14.4

¹ Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category. ² The number of cases for all races is not the sum of cases by race/ethnicity.

Source: Massachusetts Cancer Registry

Table 21.
AGE-ADJUSTED¹ MORTALITY RATES² AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY
RACE/ETHNICITY³
Massachusetts, 2000-2004
MALES

Cancer Site / Type	All Races		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL
All Sites	241.6	239.0 - 244.1	244.3	241.6 - 247.0	301.0	284.3 - 317.8	121.2	108.1 - 134.3	134.5	120.9 - 148.1
Brain & Other Nervous System	5.2	4.9 - 5.6	5.5	5.1 - 5.9	3.4	1.8 - 5.0	*	*	*	*
Breast	0.3	0.2 - 0.4	0.3	0.2 - 0.4	*	*	*	*	*	*
Bronchus & Lung	68.5	67.2 - 69.9	69.7	68.2 - 71.1	80.0	71.5 - 88.4	39.7	32.0 - 47.4	31.6	25.1 - 38.0
Colon / Rectum	24.6	23.7 - 25.4	25.1	24.2 - 25.9	27.0	21.9 - 32.0	9.2	5.6 - 12.9	12.4	8.0 - 16.7
Esophagus	9.8	9.3 - 10.3	10.0	9.4 - 10.5	10.3	7.3 - 13.3	*	*	6.3	3.5 - 9.2
Hodgkin Lymphoma	0.6	0.4 - 0.7	0.5	0.4 - 0.7	*	*	*	*	*	*
Kidney & Renal Pelvis	6.0	5.6 - 6.4	6.2	5.8 - 6.6	4.6	2.5 - 6.6	*	*	*	*
Larynx	2.6	2.4 - 2.9	2.7	2.4 - 2.9	*	*	*	*	*	*
Leukemia	9.2	8.7 - 9.7	9.4	8.9 - 9.9	9.2	6.3 - 12.1	*	*	4.2	1.9 - 6.5
Liver & Intrahepatic Bile Ducts	7.3	6.9 - 7.8	6.6	6.2 - 7.1	12.4	9.3 - 15.5	16.1	12.1 - 20.1	9.2	6.2 - 12.2
Melanoma of Skin	4.3	4.0 - 4.7	4.7	4.3 - 5.0	*	*	*	*	*	*
Multiple Myeloma	4.4	4.1 - 4.8	4.4	4.1 - 4.8	7.7	5.1 - 10.3	*	*	*	*
Non-Hodgkin Lymphoma	9.3	8.8 - 9.8	9.6	9.0 - 10.1	7.3	4.8 - 9.7	*	*	*	*
Oral Cavity & Pharynx	4.1	3.8 - 4.4	4.0	3.7 - 4.4	4.3	2.5 - 6.1	*	*	*	*
Pancreas	13.0	12.4 - 13.6	13.1	12.5 - 13.7	16.8	13.0 - 20.7	*	*	9.4	5.7 - 13.0
Prostate	27.4	26.5 - 28.3	27.1	26.2 - 28.0	56.9	48.9 - 64.9	*	*	15.7	10.6 - 20.9
Stomach	6.7	6.3 - 7.2	6.4	6.0 - 6.9	15.0	11.2 - 18.7	*	*	9.1	5.4 - 12.7
Testis	0.3	0.2 - 0.4	0.3	0.2 - 0.4	*	*	*	*	*	*
Thyroid	0.5	0.3 - 0.6	0.4	0.3 - 0.6	*	*	*	*	*	*
Urinary Bladder	8.8	8.3 - 9.3	9.1	8.6 - 9.6	7.7	4.8 - 10.5	*	*	*	*

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000

³ Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category.

*age-adjusted mortality rate not calculated when number of deaths was less than 20.

Source: Massachusetts Cancer Registry

Table 22.
AGE-ADJUSTED¹ MORTALITY RATES² AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY
RACE/ETHNICITY³
Massachusetts, 2000-2004
FEMALES

Cancer Site / Type	All Races		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL
All Sites	169.2	167.4 - 171.0	172.7	170.8 - 174.7	176.2	166.3 - 186.1	90.5	80.5 - 100.4	92.1	82.9 - 101.3
Brain & Other Nervous System	3.4	3.1 - 3.7	3.6	3.3 - 3.9	*	*	*	*	*	*
Breast	25.6	24.9 - 26.3	26.2	25.4 - 27.0	28.4	24.5 - 32.2	8.5	5.6 - 11.5	12.6	9.5 - 15.7
Bronchus & Lung	44.6	43.7 - 45.6	46.5	45.5 - 47.5	36.2	31.7 - 40.7	19.4	14.7 - 24.1	12.1	8.7 - 15.6
Cervix Uteri	1.6	1.4 - 1.8	1.5	1.3 - 1.7	2.7	1.6 - 3.9	*	*	*	*
Colon / Rectum	17.0	16.4 - 17.5	17.2	16.6 - 17.8	18.9	15.6 - 22.2	9.6	6.2 - 13.0	8.6	5.8 - 11.5
Corpus Uteri & Uterus, NOS	4.4	4.1 - 4.6	4.3	4.0 - 4.6	7.6	5.5 - 9.6	*	*	*	*
Esophagus	1.9	1.7 - 2.1	1.9	1.7 - 2.1	3.0	1.7 - 4.2	*	*	*	*
Hodgkin Lymphoma	0.4	0.3 - 0.5	0.5	0.3 - 0.6	*	*	*	*	*	*
Kidney & Renal Pelvis	2.4	2.2 - 2.6	2.5	2.2 - 2.7	*	*	*	*	*	*
Larynx	0.6	0.5 - 0.7	0.6	0.5 - 0.7	*	*	*	*	*	*
Leukemia	5.6	5.3 - 5.9	5.7	5.3 - 6.0	5.0	3.4 - 6.6	*	*	4.1	2.2 - 5.9
Liver & Intrahepatic Bile Ducts	2.6	2.3 - 2.8	2.4	2.2 - 2.6	3.9	2.4 - 5.4	5.6	3.1 - 8.0	4.5	2.4 - 6.6
Melanoma of Skin	2.0	1.8 - 2.2	2.2	2.0 - 2.4	*	*	*	*	*	*
Multiple Myeloma	3.0	2.8 - 3.3	3.0	2.7 - 3.2	5.6	3.8 - 7.5	*	*	*	*
Non-Hodgkin Lymphoma	6.5	6.1 - 6.8	6.5	6.2 - 6.9	6.8	4.8 - 8.7	*	*	3.9	2.0 - 5.8
Oral Cavity & Pharynx	1.6	1.4 - 1.8	1.6	1.5 - 1.8	*	*	*	*	*	*
Ovary	9.2	8.7 - 9.6	9.6	9.1 - 10.1	5.4	3.7 - 7.2	*	*	4.5	2.6 - 6.5
Pancreas	10.1	9.6 - 10.5	10.2	9.7 - 10.6	11.1	8.6 - 13.7	6.4	3.7 - 9.1	7.8	5.0 - 10.6
Stomach	3.3	3.1 - 3.6	3.1	2.9 - 3.3	5.8	4.0 - 7.6	6.5	3.9 - 9.2	4.1	2.1 - 6.1
Thyroid	0.5	0.4 - 0.6	0.4	0.4 - 0.5	*	*	*	*	*	*
Urinary Bladder	2.8	2.5 - 3.0	2.8	2.6 - 3.1	*	*	*	*	*	*

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000

³ Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category.

*age-adjusted mortality rate not calculated when number of deaths was less than 20.

Source: Massachusetts Cancer Registry

Table 23.
AGE-ADJUSTED¹ MORTALITY RATES² AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY
RACE/ETHNICITY³
Massachusetts, 2000-2004
TOTAL

Cancer Site / Type	All Races		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL
All Sites	197.0	195.5 - 198.5	200.0	198.5 - 201.6	223.9	215.1 - 232.6	104.4	96.4 - 112.4	109.6	101.9 - 117.4
Brain & Other Nervous System	4.2	4.0 - 4.5	4.5	4.2 - 4.7	2.4	1.6 - 3.2	2.6	1.4 - 3.8	1.8	0.9 - 2.6
Breast	14.8	14.4 - 15.2	15.1	14.7 - 15.5	16.6	14.3 - 18.9	4.9	3.2 - 6.6	7.2	5.3 - 9.0
Bronchus & Lung	54.3	53.5 - 55.1	55.8	55.0 - 56.6	53.7	49.4 - 57.9	28.4	24.1 - 32.7	20.3	17.0 - 23.7
Cervix Uteri	— ⁴	—	—	—	—	—	—	—	—	—
Colon / Rectum	20.1	19.6 - 20.6	20.5	20.0 - 21.0	22.1	19.3 - 24.9	9.6	7.1 - 12.2	10.1	7.7 - 12.5
Corpus Uteri & Uterus, NOS	—	—	—	—	—	—	—	—	—	—
Esophagus	5.3	5.0 - 5.5	5.4	5.1 - 5.6	5.9	4.5 - 7.3	*	*	3.6	2.2 - 4.9
Hodgkin Lymphoma	0.5	0.4 - 0.5	0.5	0.4 - 0.6	*	*	*	*	*	*
Kidney & Renal Pelvis	3.9	3.7 - 4.1	4.0	3.8 - 4.3	3.2	2.1 - 4.3	*	*	*	*
Larynx	1.4	1.3 - 1.6	1.4	1.3 - 1.6	2.4	1.5 - 3.4	*	*	*	*
Leukemia	7.0	6.8 - 7.3	7.2	6.9 - 7.5	6.5	5.1 - 8.0	4.2	2.6 - 5.7	4.2	2.7 - 5.6
Liver & Intrahepatic Bile Ducts	4.7	4.4 - 4.9	4.2	4.0 - 4.5	7.6	6.0 - 9.2	10.7	8.3 - 13.0	6.7	4.9 - 8.5
Melanoma of Skin	2.9	2.8 - 3.1	3.2	3.0 - 3.4	*	*	*	*	*	*
Multiple Myeloma	3.6	3.4 - 3.8	3.6	3.3 - 3.8	6.7	5.1 - 8.2	*	*	2.8	1.5 - 4.1
Non-Hodgkin Lymphoma	7.6	7.3 - 7.9	7.8	7.5 - 8.1	7.1	5.5 - 8.6	4.7	2.9 - 6.4	3.5	2.2 - 4.8
Oral Cavity & Pharynx	2.7	2.5 - 2.9	2.7	2.5 - 2.9	2.6	1.7 - 3.4	3.2	1.9 - 4.6	2.0	1.1 - 2.9
Ovary	—	—	—	—	—	—	—	—	—	—
Pancreas	11.4	11.0 - 11.7	11.4	11.1 - 11.8	13.5	11.4 - 15.7	6.0	4.1 - 8.0	8.5	6.3 - 10.8
Prostate	—	—	—	—	—	—	—	—	—	—
Stomach	4.7	4.5 - 4.9	4.5	4.2 - 4.7	9.4	7.6 - 11.2	5.7	3.8 - 7.6	6.1	4.2 - 8.0
Testis	—	—	—	—	—	—	—	—	—	—
Thyroid	0.5	0.4 - 0.5	0.4	0.4 - 0.5	*	*	*	*	*	*
Urinary Bladder	5.1	4.8 - 5.3	5.2	5.0 - 5.5	4.3	3.1 - 5.6	*	*	*	*

¹ age-adjusted to the 2000 U.S. Standard Population. ² per 100,000

³ Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category. ⁴ Dashed out cancers are found in only one sex

*age-adjusted mortality rate not calculated when number of deaths was less than 20.

Source: Massachusetts Cancer Registry

INCIDENCE AND MORTALITY RATES¹ FOR SELECTED CANCER SITES BY SEX
Massachusetts Residents, 2000-2004, and NAACCR Registries, 2000-2004

Table 24.

Cancer Site / Type	MALES				FEMALES			
	Incidence		Mortality		Incidence		Mortality	
	MA	NAACCR	MA	NAACCR	MA	NAACCR	MA	NAACCR
All Sites	604.8	557.8	241.6	238.7	455.5	413.1	169.2	162.2
Brain & Other Nervous System	8.7	7.9	5.2	5.4	6.2	5.7	3.4	3.6
Breast	1.4	1.4	0.3	0.3	136.7	125.3	25.6	25.5
Breast <i>in situ</i> ²	— ³	—	—	—	47.5	29.1	— ⁴	—
Bronchus & Lung	85.8	89.0	68.5	73.4	62.1	55.2	44.6	41.1
Cervix Uteri	—	—	—	—	6.5	8.8	1.6	2.6
Colon / Rectum	69.0	62.9	24.6	23.5	49.4	45.8	17.0	16.4
Corpus Uteri & Uterus, NOS	—	—	—	—	28.3	23.0	4.4	4.1
Esophagus	11.6	8.6	9.8	7.8	2.5	2.1	1.9	1.8
Hodgkin Lymphoma	3.6	3.2	0.6	0.6	2.9	2.5	0.4	0.4
Kidney & Renal Pelvis	18.8	18.4	6.0	6.1	9.7	9.5	2.4	2.8
Larynx	7.5	7.5	2.6	2.4	1.7	1.6	0.6	0.5
Leukemia	14.6	16.0	9.2	10.0	9.5	9.6	5.6	5.7
Liver & Intrahepatic Bile Ducts	9.1	7.8	7.3	5.9	2.6	2.5	2.6	2.1
Melanoma of Skin	25.2	21.1	4.3	3.9	17.6	13.6	2.0	1.7
Multiple Myeloma	7.0	6.9	4.4	4.6	4.0	4.6	3.0	3.1
Non-Hodgkin Lymphoma	23.5	22.8	9.3	9.6	16.9	16.2	6.5	6.2
Oral Cavity & Pharynx	16.5	16.0	4.1	4.1	6.6	6.1	1.6	1.5
Ovary	—	—	—	—	14.7	13.5	9.2	8.9
Pancreas	13.0	12.9	13.0	12.2	10.6	10.0	10.1	9.2
Prostate	176.1	160.8	27.4	27.9	—	—	—	—
Stomach	11.9	10.5	6.7	5.9	5.2	5.0	3.3	3.0
Testis	6.2	5.3	0.3	0.3	—	—	—	—
Thyroid	5.2	4.3	0.5	0.5	15.8	12.4	0.5	0.5
Urinary Bladder	46.8	38.4	8.8	7.5	12.8	9.8	2.8	2.3

¹ Rates are age-adjusted to the 2000 U.S. Standard Population

² Breast *in situ* is excluded from all sites, from breast cancer type and is not presented for males

³ Dashed out cancers found in only one sex.

⁴ Rates are not available for that cancer subtype.

Source: Massachusetts Cancer Registry and North American Association of Central Cancer Registries

SPECIAL SECTION:
URINARY BLADDER CANCER

Urinary Bladder Cancer

Introduction

Urinary bladder cancer was the fourth leading cancer diagnosed in males and the ninth leading cancer diagnosed in females in Massachusetts between 2000 and 2004 (Figure 2). It was the eighth leading cause of cancer deaths in males and the twelfth leading cause of cancer deaths in females in the state (Figure 4 and Table 22). For the period 2000-2004, the average annual age-adjusted incidence rate of urinary bladder cancer was 46.8 cases per 100,000 males and 12.8 cases per 100,000 females (Tables 14 and 15). Massachusetts males were 3.6 times more likely to develop urinary bladder cancer than females. The age-adjusted mortality rate of urinary bladder cancer was higher in males (8.8 deaths per 100,000 males) than in females (2.8 deaths per 100,000 females) in the period 2000-2004 (Tables 21 and 22). Massachusetts males were 3.1 times more likely to die from urinary bladder cancer than were females.

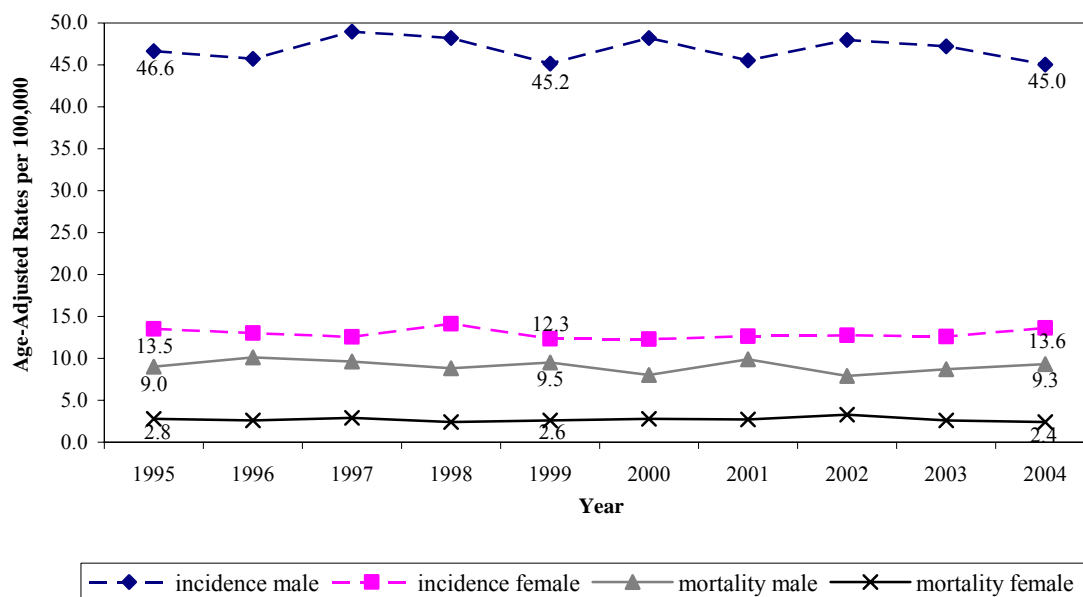
Urinary bladder cancer is the only cancer in which *in situ* and invasive cases are combined when calculating cancer statistics. *In situ* and localized stages can be difficult to distinguish for urinary bladder cancer and tend to be classified at the discretion of the pathologist. Urinary bladder cancers diagnosed at these stages tend to have similar diagnostic protocols and treatment patterns.

The national survival rates for urinary bladder cancer during 1996-2002 demonstrated that 82.8% of males and 75.4% of females survived five years after diagnosis (14). There are no recommended screening tests to detect urinary bladder cancer at its early stages, when survival would be a greater possibility.

Smoking is one of the known risk factors that have a cumulative effect on the bladder, when chemical compounds from tobacco continually collect in the urine before being released from the bladder (15, 16). The Massachusetts Tobacco Control Program promotes cessation programs among smokers in the state, and prevention programs among non-smokers, in an effort to decrease cancer incidence.

Long Term Incidence and Mortality Trends

Figure 7.
AGE-ADJUSTED¹ URINARY BLADDER CANCER INCIDENCE AND
MORTALITY RATES² FOR MALES AND FEMALES
Massachusetts, 1995-2004



¹age-adjusted to the 2000 U.S. Standard Population ²per 100,000
Sources: Massachusetts Cancer Registry

Age-adjusted incidence and mortality rates for Massachusetts males and females for the years 1995 to 2004 are presented in Figure 7. Both incidence and mortality rates remained higher for males than for females and exhibited only a slight variation in rates throughout the whole time period.

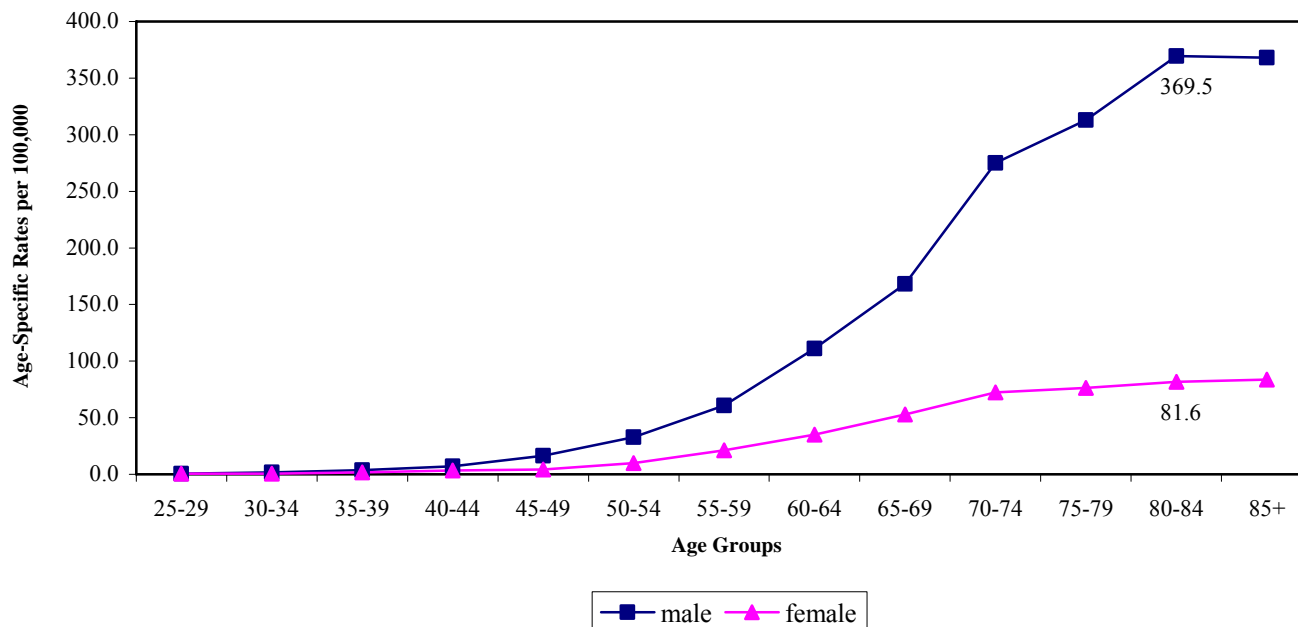
Long-term incidence and mortality trends for each sex were analyzed using a joinpoint regression model and a statistical method to determine the estimated annual percent change (EAPC), as described in the METHODS section of this report. The results of the analysis are as follows:

- The incidence rate for males declined 0.2% per year for 1995-2004.
- The mortality rate for males declined 0.9% per year for 1995-2004.
- The incidence rate for females declined 0.3% per year for 1995-2004.
- The mortality rate for females declined 0.2% per year for 1995-2004.

Trends were not significant for either the incidence or mortality rates for 1995-2004. The declines are not considered statistically significant over that ten-year period.

Age-Specific Incidence Rates by Sex

Figure 8.
AGE-SPECIFIC URINARY BLADDER CANCER INCIDENCE RATES¹ FOR MALES AND FEMALES
Massachusetts 2000-2004



¹per 100,000

The values for the 2000-2004 age-specific rates are presented in Tables 1-3.

Source: Massachusetts Cancer Registry

Age-specific incidence rates for Massachusetts residents were low before age 40. Rates in males started to rise steadily beginning at age 40, while rates in females did not start to rise until age 50. Male rates reached a plateau of 369.5 per 100,000 in the age group 80-84, while female rates rose slowly from age 50 through 85 plus. The median age for developing urinary bladder cancer was 72 years old for males and 73 years old for females during the period 2000-2004, as shown in Tables 1 through 3.

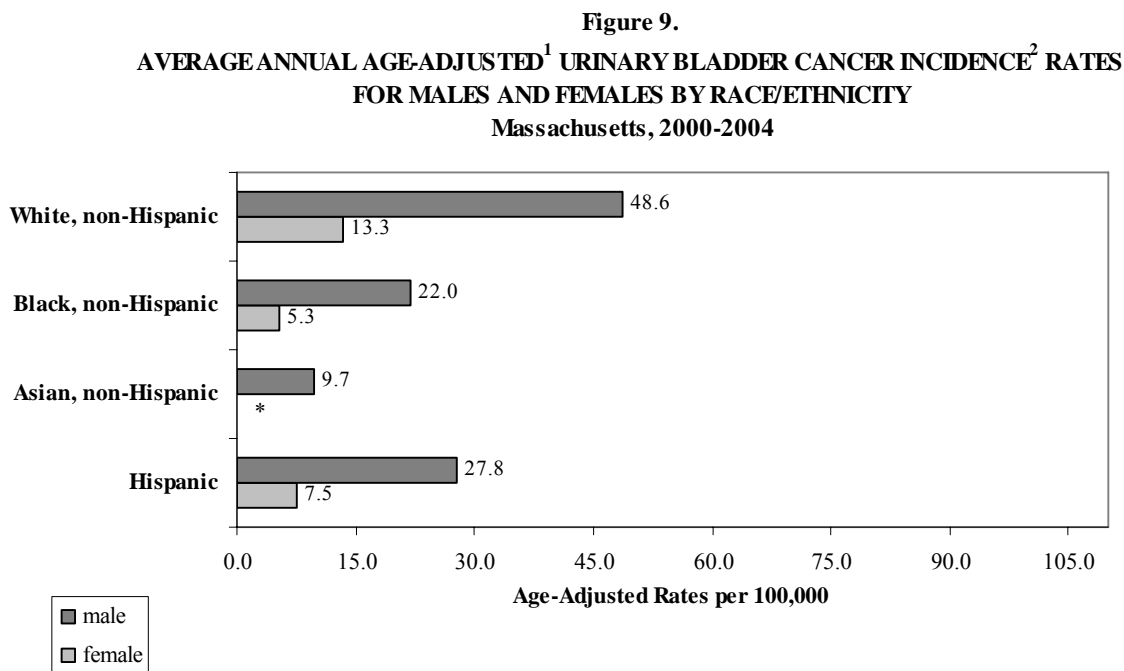
Several possible explanations exist for the patterns of age-adjusted and age-specific rates. The highest incidence of urinary bladder cancer was found among older males, even though there was a slight decline in both incidence and mortality over a ten-year period. The major risk factor is smoking, because chemical compounds from tobacco are collected in the urine, then discharged through the bladder. As of 2001, older Americans -- those persons born between 1900 and 1948 who are now aged 50 and over -- had smoking rates among the highest of any segment of the U.S. population (17). In the mid-1960s, about 54% of adult males were current smokers and another 21% were former smokers, while over 34% of adult females were current smokers and another 8% were former smokers (17). Today, most smoking-related deaths are the result of these high smoking rates (17). Bladder cancer incidence in females, however, remained relatively low in comparison to incidence in males, even in later years.

A second risk factor for urinary bladder cancer is exposure to chemicals, specifically aromatic amines used in various industries. These chemicals can enter the body through various routes (lungs, mouth, skin, etc.), and then collect in the bladder as urine. Between 1910 and 1930, animal studies and worker exposure experiences were used to determine lists of exposure limits and hazardous concentrations for the more prominent substances (18). As the 1940s began, research started to focus on how multiple exposures to a particular concentration of a chemical could affect a person over a long period, developing practices for allowable substance exposure, and defining maximum allowable concentration exposure (18). Between the 1940s and

1960s, these exposure concepts were constantly being reevaluated, while lists of substances that were monitored increased, and acceptable levels for those substances were established (18). The enactment of the Occupational Safety and Health Act of 1970 made the health and safety of American workers a priority (18). People born between 1900 and 1948 would have worked during the time when chemical exposures were a common occurrence in the workplace and the levels of these exposures were higher, however. This may help to explain the higher male incidence rates in older men, who may have worked in these industries (such as textiles, leather, rubber, paint products, and printing companies) before stringent health and safety regulations were put into place.

One theory behind the reason for the lower female incidence of urinary bladder cancer is that estrogen found in females is protective to the urinary system. One study that was done using data from the Nurses Health Study found an increased risk of bladder cancer with earlier age at menopause compared with later age at menopause; this association was significantly modified by cigarette smoking status (19). This is one of the few studies that has looked at estrogen as a protective agent for the bladder. Cigarette smoke is known as an antiestrogenic and may cause early menopause. In a study that supports the estrogen theory, a human bladder tumor cell line, R198, grew well in the presence of androgens (male reproductive hormones), but not in the presence of estrogens (19). Estrogen has beneficial effects on the muscles of the bladder, bladder lining, and urethra and on the connective tissues within the pelvis (20), and bladder incontinence has been known to occur when estrogen levels start to decline during menopause. This theory may help explain the large difference between the male and female incidence rates.

Incidence Rates by Race/Ethnicity and Sex



¹age-adjusted to 2000 U.S. Standard Population ²per 100,000

*Rates based on less than 20 cases are not calculated

Source: Massachusetts Cancer Registry

Figure 9 presents the average annual age-adjusted urinary bladder cancer incidence rates by race/ethnicity:

- White, non-Hispanic males and females had the highest urinary bladder cancer incidence rates.
- White, non-Hispanic males had an incidence rate 5.0 times higher than Asian, non-Hispanics, 2.2 times higher than black, non-Hispanics, and 1.7 times higher than Hispanics.
- White, non-Hispanic females had an incidence rate 2.5 times higher than black, non-Hispanics and 1.8 times higher than Hispanics. There were fewer than 20 new cases of urinary bladder cancer in Asian, non-Hispanic females during this period, so a rate could not be calculated for this group.

Mortality rates were not presented in a graph since there were fewer than 20 deaths from urinary bladder cancer in black, non-Hispanic females, Asian, non-Hispanic males and females, and Hispanic males and females for the period 2000 through 2004. Mortality rates by sex and race/ethnicity were only available for white, non-Hispanic males (9.1 per 100,000) and females (2.8 per 100,000) and black, non-Hispanic males (7.7 per 100,000).

In Massachusetts for the years 2000-2004, white, non-Hispanics had higher incidence rates for bladder cancer than black, non-Hispanics, Asian, non-Hispanics and Hispanics. While smoking and occupational exposures are the major risk factors for all race/ethnicities, these are not the only factors that may contribute to the disease. Other factors that need to be considered when comparing racial/ethnic groups are environmental exposures, lifestyle decisions (exercise, nutrition, etc.), socioeconomic status, and cultural factors, which can influence both access to care and the willingness to seek care (21). Genetic factors are being studied in order to determine whether certain racial/ethnic groups are more vulnerable to cancer. One study of white, non-Hispanic bladder cancer patients looked at the relationship between DNA sequence variations (single nucleotide polymorphisms, or SNPs) and the risk of developing bladder cancer. It found that this technique allowed researchers to identify associations between individual SNPs and cancer risk that would be otherwise undetectable (22). Thus, race/ethnicity data should be combined with other factors in order to better assess urinary bladder cancer incidence in racial/ethnic subgroups.

Urinary Bladder Cancer by Histology Groups and Sex

The three main histological groups of urinary bladder cancer are transitional cell carcinomas, squamous cell carcinomas, and adenocarcinomas. Transitional cell carcinomas are the most common types of urinary bladder cancer, and can be either *in situ* or invasive cancers. Squamous cell carcinomas and adenocarcinomas are less common types of urinary bladder cancer, and tend to develop into invasive cancers (23). Histology is an important factor in making the appropriate treatment decisions. Knowing the cell type of the cancer can aid in individualizing treatment, and increase the success of that treatment.

In Massachusetts from 2000-2004, transitional cell carcinoma represented 96.2% of male bladder cancers, 93.3% of female bladder cancers, and 95.4% of all bladder cancers. Squamous cell carcinoma represented 0.8% of male bladder cancers, 2.1% of female bladder cancers, and 1.1% overall. Adenocarcinoma represented 0.3% of male bladder cancers, 0.6% of female bladder cancers, and 0.4% overall. (See Appendix U-III for histology groupings used.)

Transitional cell carcinomas occur in the flexible cells lining the bladder. Transitional cells are cells that can be stretched without breaking apart, and which vary in shape. They allow the bladder to expand in order to hold varying quantities of urine (24). Squamous cell carcinomas occur in the flat cells that line the bladder. (24) Adenocarcinomas are cancers that occur in the cells that line certain internal organs (such as the bladder) and secrete mucus and other fluids (23, 25). These cells tend to be located around the openings through which urine enters and leaves the bladder. (26)

Squamous cell carcinomas have been known to develop following chronic infections or a parasitic infection in the bladder known as Schistosomiasis (23). *Schistosoma haematobium* is a trematode (worm) species that uses a human host in its life cycle, after a snail intermediate host. The parasite penetrates skin exposed to water as an infective larva, then travels to the veins in the bladder, where it matures and produces eggs. The eggs are flushed out of the body with the urine, but some embed in the lining and cause an immune response that can damage the bladder lining (26). The clinical evidence—eggs in the stool or urine—can be the only sign of an infection. One complication of Schistosomiasis is squamous cell carcinoma of the bladder. A number of studies from Africa have shown that the estimated incidence of urinary bladder cancer is higher in areas with a high prevalence of infection with *S. haematobium* than in areas with a low prevalence (28). Schistosomiasis is found mostly in the Middle East, India, Africa, Central America, and South America, but people traveling in these regions need to be aware of this disease's existence (27, 28).

Urinary Bladder Cancer by Stage and Sex

Urinary bladder cancer is staged based on the results of diagnostic tests, biopsies, and imaging tests. As noted previously, *in situ* bladder cancers are combined with invasive cancers due to difficulties in differentiating the two stages. For the purposes of this report, *in situ* and localized stages are combined into an early stage classification, and regional and distant stages are combined into a late stage classification. The following stage definitions provide the general classifications for the stages at which cancer is diagnosed (29).

Stage Definition

These are five stage classifications, which help to determine treatment options and prognosis (30).

1. *In Situ (early stage)*

The earliest stage of cancer, before the cancer has spread, when it is limited to a small number of cells and has not invaded the organ itself.

2. *Localized (early stage)*

The cancer is found only in the body part (organ) where it began; it hasn't spread to any other parts.

3. **Regional (*late stage*)**

The cancer has spread beyond the original point where it started to the nearest surrounding part of the body (other tissues).

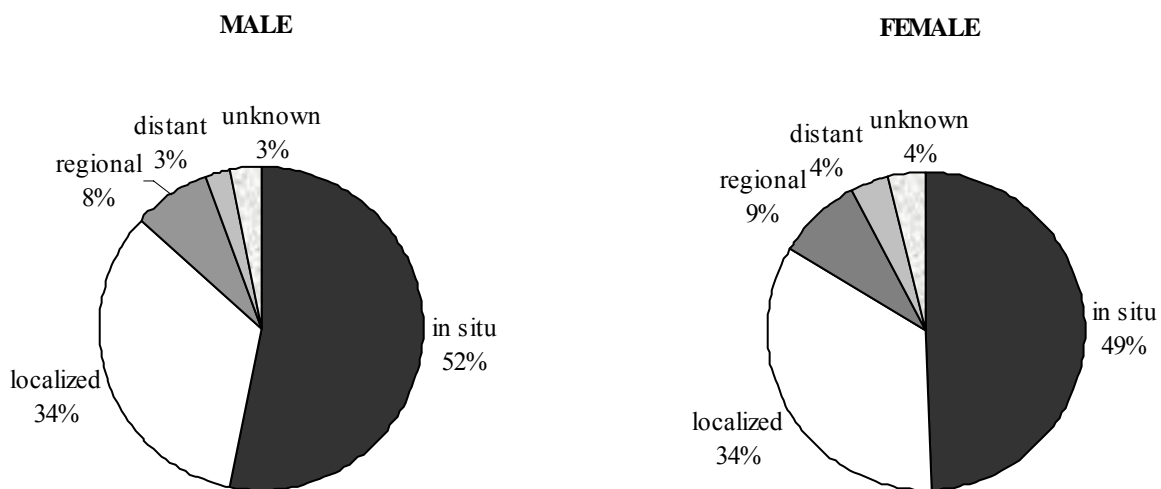
4. **Distant (*late stage*)**

The cancer has spread to parts of the body far away from the original point where it began. This is the most difficult stage to treat, since the cancer has spread throughout the body.

5. **Unstaged (*unknown*)**

There is not enough information about the cancer to assign a stage.

Figure 10.
DISTRIBUTION OF *IN SITU* AND INVASIVE URINARY BLADDER CANCER INCIDENT CASES BY STAGE AND SEX
Massachusetts, 2000-2004



Source: Massachusetts Cancer Registry

Urinary bladder cancer was detected at an early stage (*in situ* and localized combined) in 86.8% of males and 83.5% of females. Only 10.1% of males and 12.5% of females were diagnosed at a late stage (regional and distant combined). Urinary bladder cancer is not routinely screened for in the general population. Rather, screening is generally only done in individuals who previously had bladder cancer or who have birth defects of the bladder. This screening consists of microscopically examining the urine for blood or bladder cells and/or using cystoscopy to view the bladder. There are several new tests that have the potential to be used as screening tests, but none of them have been recommended yet for nationwide screening. (15).

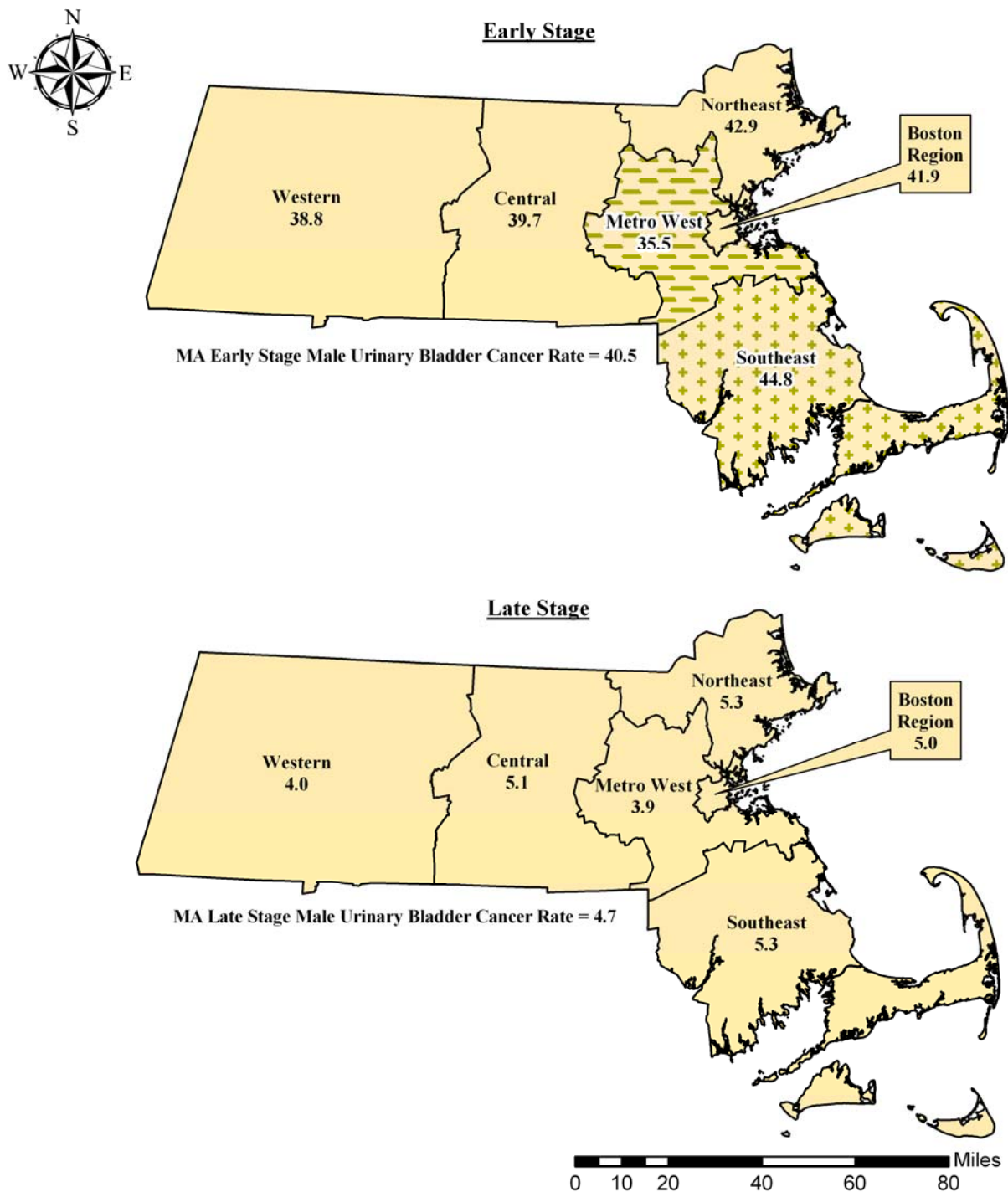
Urinary Bladder Cancer by Region vs. State

The urinary bladder cancer incidence rates that were calculated for this portion of the report were separated into geographic sections of the state using the following six regions, as defined by the Massachusetts Executive Office of Health and Human Services (EOHHS): Western, Central, Northeast, Metro West, Southeast, and Boston (Figures 11 and 12). Data for each region were stratified into early stage and late stage categories. (See section “Urinary Bladder Cancer by Stage and Sex” for stage classifications.) The urinary bladder cancer incidence rates for each category by regions were compared to the Massachusetts incidence rates for each category, and statistically significant differences were identified.

Statistical significance for this report was determined using 95% confidence intervals. The confidence intervals were used to determine whether the regional age-adjusted incidence rates for each cancer were

statistically significantly different from the state rates (30). The two rates were different with 95% probability if the confidence intervals that surrounded the regional and state rates *did not* overlap. The two rates were not statistically different if the confidence intervals that surrounded the regional and state rates *did* overlap. The age-adjusted incidence rates and 95% confidence intervals for Figures 11 and 12 are presented in Appendices U-I and U-II.

Figure 11
Age-Adjusted ¹ Male Urinary Bladder Cancer Incidence Rates ² by Stage at Diagnosis
Massachusetts by EOHHS Region
2000-2004



Map Key

- Regional rate is statistically significantly higher than the state rate.
- Regional rate is statistically significantly lower than the state rate.
- Regional rate is not statistically significantly different from the state rate.

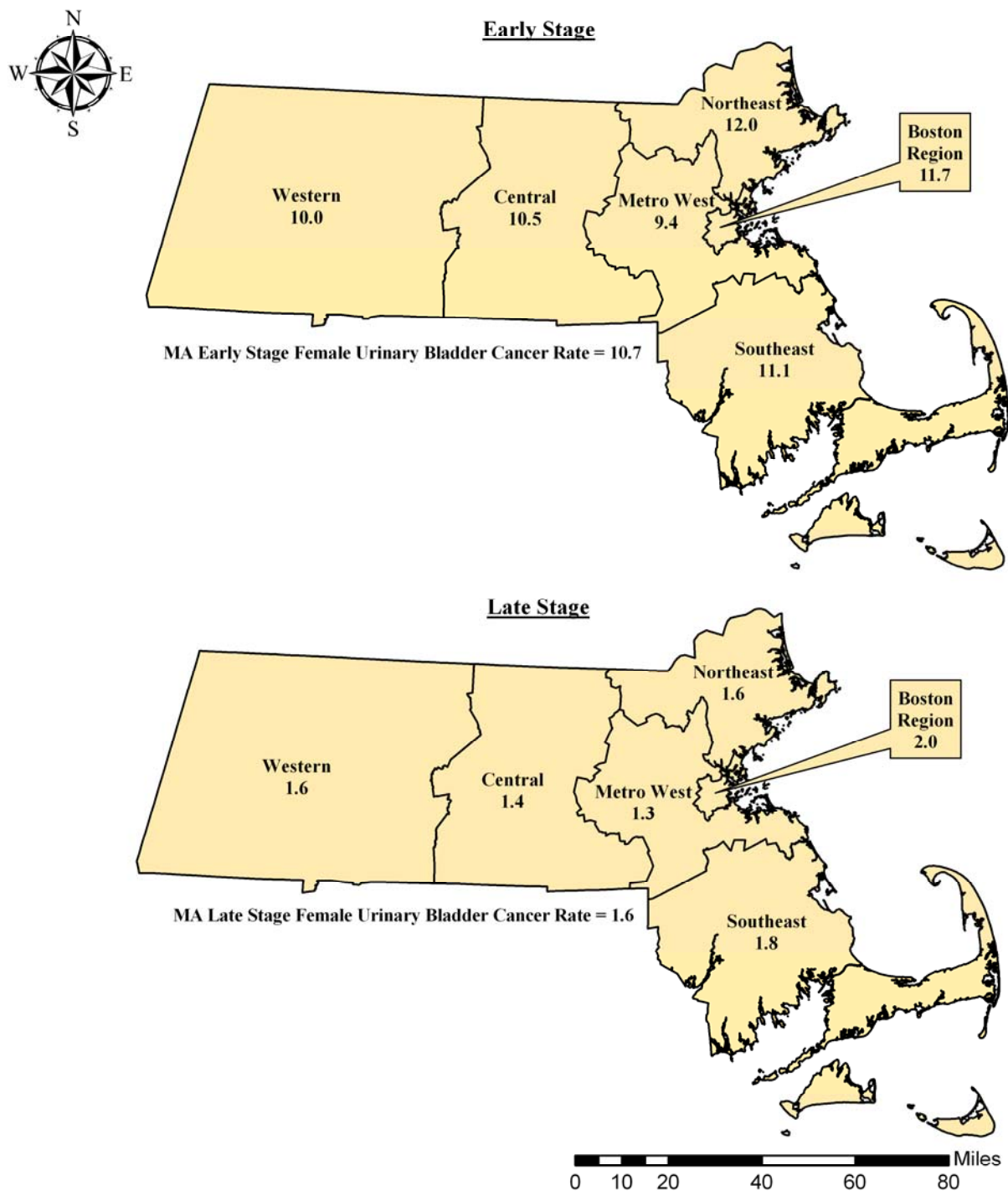
¹Age-Adjusted to the 2000 U.S. Standard Population ²per 100,000

Source: Massachusetts Department of Public Health, Center for Health Information, Statistics, Research and Evaluation, Massachusetts Cancer Registry

Cartographic Data Source: Executive Office of Environmental Affairs, MassGIS.



Figure 12
Age-Adjusted ¹ Female Urinary Bladder Cancer Incidence Rates ² by Stage at Diagnosis
Massachusetts by EOHHS Region
2000-2004



Map Key

- Regional rate is statistically significantly higher than the state rate.
- Regional rate is statistically significantly lower than the state rate.
- Regional rate is not statistically significantly different from the state rate.

¹ Age-Adjusted to the 2000 U.S. Standard Population ² per 100,000

Source: Massachusetts Department of Public Health, Center for Health Information, Statistics, Research and Evaluation, Massachusetts Cancer Registry

Cartographic Data Source: Executive Office of Environmental Affairs, MassGIS.



Urinary bladder cancer rates were found to be statistically significant within the following regions for the early stage:

- Metro West had a lower male rate when compared to the state male rate.
- Southeast had a higher male rate when compared to the state male rate.

There were no statistically significant differences between regional and state rates for late-stage diagnoses.

The results presented in Figures 11 and 12 depict the distribution of urinary bladder cancer cases by sex, stage, and region in Massachusetts. It is important to note that the incidence rates within these stage categories provide only general information about cancer distribution within Massachusetts. While this information can help to identify areas of possible concern, additional factors must be considered.

Many factors can influence whether a person develops cancer and the stage at which that cancer is diagnosed. These factors include race/ethnicity, smoking status, exposure history, length of residency, health behaviors, access to medical care, and aging. Such factors may be differently distributed in different regions. For example, a portion of the state may have a younger or older population than the state as a whole, better or poorer access to care, or lower or higher smoking rates. Additionally, the completeness of information on these factors may vary. Thus, it is critical to include information on as many of these factors as possible. (31, 32; Wendy Cozen, DO, MPH, University of Southern California Cancer Surveillance Program, written communication, May 2005). For these reasons, the rates presented in these maps should only be used in a preliminary fashion for identifying regions in which further study may be warranted.

Probability of Developing or Dying from Urinary Bladder Cancer

The probability of being diagnosed with or dying from urinary bladder cancer (Tables 25 and 26) was calculated using software developed by the National Cancer Institute's SEER Program, as described in the main introduction of this report. The results are presented as tables showing the probability (as a percentage) of a person in a specific five-year age group being diagnosed with or dying from urinary bladder cancer for every five years past his or her present age or remaining lifetime. The lifespan was restricted to the age 85 in this analysis.

It is important to note that the numbers in these tables combine smokers and non-smokers. Smoking is the most important risk factor for urinary bladder cancer; the probabilities will differ depending on whether one is a smoker or non-smoker.

To find the probability of developing urinary bladder cancer or the probability of dying from urinary bladder cancer for a male (M) or female (F) of a certain age:

- Find the individual's age in the 'current age' column.
- Look across the row for the number that corresponds to the sex and age of interest for the probability of developing urinary bladder cancer or the probability of dying from urinary bladder cancer.
- The percentage shown is the probability of developing or dying from urinary bladder cancer for an alive and cancer-free individual by the age of interest.

Example: For a 50-year-old man, the probability of developing urinary bladder cancer by the age of 70 is 1.5%. A woman of the same age has a 0.5% probability of developing cancer by the age of 70.

Table 25.
PROBABILITY OF DEVELOPING URINARY BLADDER CANCER BY A SPECIFIC AGE
FOR MALES AND FEMALES
Massachusetts, 2000-2004

current age	Percentage Estimate of Developing Urinary Bladder Cancer by a Certain Age																	
	45		50		55		60		65		70		75		80		85	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0-85 yrs	0.1	0.0	0.1	0.1	0.3	0.1	0.5	0.2	1.0	0.3	1.5	0.5	2.3	0.8	2.9	1.0	3.5	1.2
5 yrs	0.1	0.0	0.1	0.1	0.3	0.1	0.5	0.2	1.0	0.3	1.5	0.5	2.3	0.8	3.0	1.0	3.5	1.2
10 yrs	0.1	0.0	0.1	0.1	0.3	0.1	0.6	0.2	1.0	0.3	1.5	0.5	2.3	0.8	3.0	1.0	3.5	1.2
15 yrs	0.1	0.0	0.1	0.1	0.3	0.1	0.6	0.2	1.0	0.3	1.5	0.5	2.3	0.8	3.0	1.0	3.5	1.2
20 yrs	0.1	0.0	0.1	0.1	0.3	0.1	0.6	0.2	1.0	0.3	1.5	0.5	2.3	0.8	3.0	1.0	3.5	1.2
25 yrs	0.1	0.0	0.1	0.1	0.3	0.1	0.6	0.2	1.0	0.3	1.5	0.5	2.3	0.8	3.0	1.0	3.6	1.2
30 yrs	0.1	0.0	0.1	0.1	0.3	0.1	0.6	0.2	1.0	0.3	1.5	0.5	2.3	0.8	3.0	1.0	3.6	1.2
35 yrs	0.1	0.0	0.1	0.0	0.3	0.1	0.5	0.2	1.0	0.3	1.5	0.5	2.3	0.8	3.0	1.0	3.6	1.2
40 yrs	0.0	0.0	0.1	0.0	0.3	0.1	0.5	0.2	1.0	0.3	1.5	0.5	2.3	0.8	3.0	1.0	3.6	1.2
45 yrs			0.1	0.0	0.2	0.1	0.5	0.2	0.9	0.3	1.5	0.5	2.3	0.8	3.0	1.0	3.6	1.2
50 yrs					0.2	0.0	0.4	0.1	0.9	0.3	1.5	0.5	2.3	0.8	3.0	1.0	3.6	1.2
55 yrs							0.3	0.1	0.7	0.3	1.4	0.5	2.2	0.7	2.9	1.0	3.5	1.2
60 yrs									0.5	0.2	1.1	0.4	2.0	0.6	2.8	0.9	3.4	1.1
65 yrs											0.7	0.2	1.6	0.5	2.5	0.8	3.2	1.0
70 yrs													1.0	0.3	2.0	0.6	2.8	0.8
75 yrs															1.1	0.3	2.1	0.6
80 yrs																	1.2	0.3

Source: Massachusetts Cancer Registry

Based on the 2000-2004 incidence data for urinary bladder cancer, there was a less than 0.1% chance of developing urinary bladder cancer in males before the age of 45. Therefore, those age segments were not included in this table.

The overall probability of developing urinary bladder cancer over the lifespan (0-85 years) was 3.5% for males and 1.2% for females.

Table 26.
PROBABILITY OF DYING FROM URINARY BLADDER CANCER BY A SPECIFIC AGE FOR
MALES AND FEMALES
Massachusetts, 2000-2004

Percentage Estimate of Dying from Urinary Bladder Cancer by a Certain Age												
current age	60		65		70		75		80		85	
	M	F	M	F	M	F	M	F	M	F	M	F
0-85 yrs	0.1	0.0	0.1	0.0	0.2	0.1	0.3	0.1	0.5	0.2	0.7	0.3
5 yrs	0.1	0.0	0.1	0.0	0.2	0.1	0.3	0.1	0.5	0.2	0.7	0.3
10 yrs	0.1	0.0	0.1	0.0	0.2	0.1	0.3	0.1	0.5	0.2	0.7	0.3
15 yrs	0.1	0.0	0.1	0.0	0.2	0.1	0.3	0.1	0.5	0.2	0.7	0.3
20 yrs	0.1	0.0	0.1	0.0	0.2	0.1	0.3	0.1	0.5	0.2	0.7	0.3
25 yrs	0.1	0.0	0.1	0.0	0.2	0.1	0.3	0.1	0.5	0.2	0.7	0.3
30 yrs	0.1	0.0	0.1	0.0	0.2	0.1	0.3	0.1	0.5	0.2	0.7	0.3
35 yrs	0.1	0.0	0.1	0.0	0.2	0.1	0.3	0.1	0.5	0.2	0.7	0.3
40 yrs	0.1	0.0	0.1	0.0	0.2	0.1	0.4	0.1	0.5	0.2	0.7	0.3
45 yrs	0.1	0.0	0.1	0.0	0.2	0.1	0.4	0.1	0.5	0.2	0.7	0.3
50 yrs	0.1	0.0	0.1	0.0	0.2	0.1	0.4	0.1	0.5	0.2	0.7	0.3
55 yrs	0.0	0.0	0.1	0.0	0.2	0.1	0.3	0.1	0.5	0.2	0.7	0.3
60 yrs			0.1	0.0	0.2	0.1	0.3	0.1	0.5	0.2	0.7	0.3
65 yrs					0.1	0.0	0.3	0.1	0.5	0.2	0.7	0.3
70 yrs							0.2	0.1	0.4	0.1	0.6	0.2
75 yrs									0.3	0.1	0.6	0.2
80 yrs											0.4	0.1

Source: Massachusetts Cancer Registry

Based on 2000-2004 mortality data for urinary bladder cancer, there was a less than 0.1% chance of dying from urinary bladder cancer in males before the age of 60. Therefore, those age segments were not included in this table.

The overall probability of dying from urinary bladder cancer over the lifespan (0-85 years) was 0.7% for males and 0.3% for females.

See beginning of the section entitled ‘Probability of Developing or Dying from Urinary Bladder Cancer’ for further discussion of these charts and how to interpret them.

SUMMARY

- Age-adjusted incidence and mortality rates were higher for males than for females, and had trends that slightly decreased over the last decade.
- Female incidence and mortality trends slightly decreased over the last decade.
- Male age-specific rates remained higher than female age-specific rates for ages 45 and above.
- White, non-Hispanic males and females had the highest incidence rates of urinary bladder cancer among all race/ethnicity groups.

- Urinary bladder cancer was detected at an early stage in more than 80% of males and females.
- The overall probability of developing urinary bladder cancer over the lifespan (0-85 years) was 3.5% for males and 1.2% for females.
- The overall probability of dying from urinary bladder cancer over the lifespan (0-85 years) was 0.7% for males and 0.3% for females.

APPENDIX U-I

Age-adjusted¹ Incidence Rates², Number of Cases, 95% Confidence Limits (95% CL), and Significance³ for Urinary Bladder Cancer by Region and Stage

Massachusetts, 2000-2004
Males

Urinary Bladder				
early stage				
Region	Cases	Rates	95% CL	Significance
Western	759	38.8	36.0-41.6	
Central	688	39.7	36.7-42.7	
Northeast	1193	42.9	40.4-45.3	
Metro West	1191	35.5	33.5-37.5	-
Southeast	1376	44.8	42.4-47.2	+
Boston	551	41.9	38.4-45.4	
Statewide	5758	40.5	39.4-41.5	reference

Urinary Bladder				
late stage				
Region	Cases	Rates	95%CL	Significance
Western	78	4.0	3.1-4.9	
Central	88	5.1	4.0-6.2	
Northeast	150	5.3	4.5-6.2	
Metro West	129	3.9	3.2-4.5	
Southeast	164	5.3	4.5-6.2	
Boston	65	5.0	3.8-6.2	
Statewide	674	4.7	4.4-5.1	reference

¹age-adjusted to the 2000 U.S. Standard Population

²per 100,000

³The patterns of minuses (–) and pluses (+) indicate regional statistical significance that is based on whether there is overlap in the 95% confidence interval ranges for the state and region. (–) indicates the region's rate is significantly lower than the state's rate. (+) indicates the region's rate is significantly higher than the state's rate.

Source: Massachusetts Cancer Registry

APPENDIX U-II

Age-adjusted¹ Incidence Rates², Number of Cases, 95% Confidence Limits (95% CL), and Significance³ for Urinary Bladder Cancer by Region and Stage

Massachusetts, 2000-2004
Females

Urinary Bladder				
early stage				
Region	Cases	Rates	95% CL	Significance
Western	271	10.0	8.8-11.2	
Central	242	10.5	9.2-11.8	
Northeast	471	12.0	10.9-13.1	
Metro West	446	9.4	8.5-10.3	
Southeast	458	11.1	10.1-12.2	
Boston	230	11.7	10.2-13.3	
Statewide	2118	10.7	10.3-11.2	reference

Urinary Bladder				
late stage				
Region	Cases	Rates	95%CL	Significance
Western	42	1.6	1.1-2.1	
Central	35	1.4	1.0-1.9	
Northeast	64	1.6	1.2-2.0	
Metro West	65	1.3	1.0-1.7	
Southeast	74	1.8	1.4-2.2	
Boston	38	2.0	1.3-2.6	
Statewide	318	1.6	1.4-1.8	reference

¹age-adjusted to the 2000 U.S. Standard Population

²per 100,000

³The patterns of minuses (–) and pluses (+) indicate regional statistical significance that is based on whether there is overlap in the 95% confidence interval ranges for the state and region. (–) indicates the region's rate is significantly lower than the state's rate. (+) indicates the region's rate is significantly higher than the state's rate.

Source: Massachusetts Cancer Registry

APPENDIX U-III

Histology Grouping for the Urinary Bladder Special Section Report

Transitional cell histology: 8120, 8130, 8122, 8131, 8050

Squamous cell histology: 8070, 8052, 8071, 8074

Adenocarcinoma histology: 8140, 8255, 8323

Other histology: 8012, 8013, 8020, 8021, 8032, 8033, 8041, 8042, 8045, 8046, 8082, 8246, 8260, 8310, 8262, 8323, 8680, 8700, 8800, 8910, 8980, 8830

Unclassified histology: 8000, 8010, 8144, 8480, 8481, 8490, 8503, 8560, 8900

APPENDICES

APPENDIX I

ICD CODES USED FOR THIS REPORT

Cancer Site / Type C o d e s ICD-O-3*	ICD-10**
Brain & Other Nervous System	C70.0 - C72.9 except 9590 - 9989	C70 - C72
Breast (includes <i>in situ</i>)	C50.0 - C50.9 except 9590 - 9989	C50
Bronchus & Lung	C34.0 - C34.9 except 9590 - 9989	C34
Cervix Uteri	C53.0 - C53.9 except 9590 - 9989	C53
Colon/Rectum	C18.0 - C18.9, C19.9, C20.9, C26.0 except 9590 - 9989	C18 - C20, C26.0
Corpus Uteri & Uterus, NOS	C54.0 - C54.9, C55.9 except 9590 - 9989	C54 - C55
Esophagus	C15.0 - C15.9 except 9590 - 9989	C15
Hodgkin Lymphoma	C00.0 - C80.9 (includes 9650 - 9667)	C81
Kidney & Renal Pelvis	C64.9, C65.9 except 9590 - 9989	C64 - C65
Larynx	C32.0 - C32.9 except 9590 - 9989	C32
Leukemia	C00.0 - C80.9 (includes 9733,9742, 9800 - 9820, 9826, 9831 - 9948,9963- 9964) C42.0, C42.1, C42.4 (includes 9823, 9827)	C90.1, C91 - C95
Liver and Intra- Hepatic Bile Ducts	C22.0, C22.1 except 9590 - 9989	C22
 C o d e s	
Cancer Site / Type		

	ICD-O-3*	ICD-10**
Melanoma of Skin	C44.0 - C44.9 (includes 8720 - 8790)	C43
Multiple Myeloma	C00.0 - C80.9 (includes 9731, 9732, 9734)	C90.0, C90.2
Non-Hodgkin Lymphoma	C00.0 - C80.9 (includes 9590 - 9596, 9670 - 9729) All sites except C42.0, C42.1, C42.4 (includes 9823, 9827)	C82 - C85, C96.3
Oral Cavity & Pharynx	C00.0 - C14.8 except 9590 - 9989	C00 - C14
Ovary	C56.9 except 9590 - 9989	C56
Pancreas	C25.0 - C25.9 except 9590 - 9989	C25
Prostate	C61.9 except 9590 - 9989	C61
Stomach	C16.0 - C16.9 except 9590 - 9989	C16
Testis	C62.0 - C62.9 except 9590 - 9989	C62
Thyroid	C73.9 except 9590 - 9989	C73
Urinary Bladder (includes <i>in situ</i>)	C67.0 - C67.9 except 9590 - 9989	C67

* *International Classification of Diseases for Oncology, 3d Ed. (2)* (includes codes added since publication) for incidence data

** *International Classification of Diseases, Tenth Revision (5)* (includes codes added since publication) for mortality data

APPENDIX II:

Population and Rate Changes

Cancer Incidence and Mortality in Massachusetts 2000-2004 used new population estimates compared to the 1999-2003 report. The population estimates were produced by the National Center for Health Statistics (NCHS) in collaboration with the Census Bureau's Population Estimation Program². Each year, in addition to the most recent year's population estimates, the Census Bureau also revises the previous year's estimates, including the Census 2000 estimates. The 2004 population estimates file includes new estimates for 2000-2003. The NCHS takes the Census Bureau population estimates file and reallocates the multiple race categories required by the 1997 Office of Management and Budget (OMB) back into the four race categories specified in the 1977 OMB specifications so that the estimates will be compatible with previous years' populations. The estimates are divided into mutually exclusive racial/ethnic categories similar to those of the MCR.

Please note that the statewide age-adjusted rates published in this report cannot be compared with those published in previous years because the overall population count and the age distribution of the population, which were based on the Census 2000 count, differ. The difference in the new population estimates is pronounced for Hispanics and black non-Hispanics. The Hispanic and black non-Hispanic populations have increased 15% since 2000, while the overall state population has increased by 1%. It is important to remember that both age-adjusted cancer incidence and cancer death rates are not a measure of the actual risk of cancer or of death from it, but rather, age-adjusted rates are summary measures used to compare cancer incidence and mortality trends over time or among different populations whose age distributions differ.

Using the new population estimates has lowered certain age-adjusted cancer incidence rates, despite

an increase in the number of cases. For instance, in the 1999-2003 annual report, the number of cancer cases among black non-Hispanic women was 2,622 and in the current (2000-2004) annual report, the number of cancer cases was 2,721. While this represented an increase of 99 cases, the age-adjusted incidence rate fell from 396.6 cases per 100,000 to 358.9 cases per 100,000, largely due to the increased number of black non-Hispanics in the Massachusetts population as a result of the aforementioned changes. Mortality rates experienced similar changes to the incident rates as a result of population changes.

² National Center for Health Statistics, U.S. Department of Health and Human Services. Estimates of the July 1, 2000-July 1, 2004, United States resident population from the Vintage 2004 postcensal series by year, county, age, sex, race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. Available at: <http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm>. Accessed September 9, 2005.

Appendix III

POPULATION ESTIMATES BY AGE, RACE/ETHNICITY AND SEX

Massachusetts, 2000-2004

Age Group	White, non-Hispanic			Black, non-Hispanic			Asian, non-Hispanic			Hispanic		
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total
0-4	748,209	712,559	1,460,768	79,907	76,625	156,532	52,788	51,833	104,621	123,916	119,121	243,037
5-9	792,840	751,389	1,544,229	81,057	76,874	157,931	47,445	48,582	96,027	116,913	111,540	228,453
10-14	851,216	806,765	1,657,981	87,495	84,630	172,125	46,567	43,799	90,366	116,502	111,232	227,734
15-19	820,712	783,050	1,603,762	78,955	75,100	154,055	49,723	52,084	101,807	103,380	96,230	199,610
20-24	788,221	803,628	1,591,849	76,913	79,913	156,826	67,174	74,063	141,237	122,245	116,352	238,597
25-29	772,101	798,361	1,570,462	68,660	74,090	142,750	81,518	84,716	166,234	114,815	110,919	225,734
30-34	918,827	947,406	1,866,233	71,432	78,924	150,356	80,934	80,290	161,224	106,114	108,103	214,217
35-39	1,048,436	1,076,015	2,124,451	74,972	81,267	156,239	65,723	64,205	129,928	95,740	100,310	196,050
40-44	1,105,620	1,140,590	2,246,210	71,737	77,199	148,936	52,763	52,293	105,056	76,303	81,760	158,063
45-49	1,024,662	1,071,422	2,096,084	58,890	63,325	122,215	41,205	44,129	85,334	55,812	61,807	117,619
50-54	918,463	970,904	1,889,367	46,580	52,492	99,072	32,787	35,007	67,794	40,815	47,471	88,286
55-59	742,133	796,829	1,538,962	33,086	40,362	73,448	22,507	23,492	45,999	28,132	34,072	62,204
60-64	542,914	600,477	1,143,391	23,902	30,690	54,592	17,048	18,050	35,098	19,152	23,398	42,550
65-69	438,489	507,221	945,710	17,577	23,752	41,329	13,134	14,097	27,231	12,151	16,769	28,920
70-74	405,042	525,227	930,269	13,233	19,661	32,894	9,573	11,492	21,065	8,419	12,355	20,774
75-79	350,949	512,261	863,210	9,574	15,939	25,513	6,461	8,276	14,737	5,834	8,472	14,306
80-84	235,468	414,246	649,714	5,587	10,947	16,534	3,376	4,970	8,346	3,190	5,430	8,620
85+	170,532	433,271	603,803	4,234	9,640	13,874	2,432	4,080	6,512	2,735	5,128	7,863

Source: National Center for Health Statistics

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